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Archive

The Subscription Magazine for Archimedes Users

GammaPlot Review

Programming with SpellMaster

WIMPs Explained – Icons

Reviews of Leonardo, ArcImEd, AlphaBlockers, Desktop Enhancer, Buffer Podule, SignWriter, & Flying Start II

SoundSynth Revisited

Genesis of an Irregular Database

Another jam-packed magazine!

Once again, the magazine is packed full of useful material, though after feedback from a number of folk about the near microscopic size of the typeface used last month, I have avoided using the very smallest size of type on all but one of the pages of this issue.

There are over four pages of hints and tips this month (keep them coming), but generally there are fewer technical articles and more reviews – again it depends on what articles you, the readers, send in. Also, I think we could do with more articles at beginners' level – like the one on using the BASIC editor. Any offers anyone?

Once again, thanks to all the contributors – I do appreciate all your efforts.

I see now though why Beebug and RISC User only have 10 issues a year – it's hard work keeping going over the summer months! There are no MS-DOS or hardware sections this month because the editors of those sections have been away on holiday. Never-the-less, we've still got more than enough material.

What got squeezed out?

Articles that I wanted to use, but for which there just wasn't enough space, include a printer driver for View B3.0, reviews of ArchiText (text editor from Hope-Soft) and two printer buffers (Clares and CCD) and a fascinating article about calculating π to umpteen decimal places. I hope to fit all these into next month's issue.

To strike or not to strike...

As I write (Monday 29th) the Post Office Workers are threatening to go on strike on Wednesday, so if you haven't received your copy of this magazine yet, you will know why. (That doesn't sound quite right, somehow!?!)

I'm sure you can imagine what a devastating effect such a strike would have on Norwich Computer Services. If there is no post, our income ceases over-night! I don't know the rights and wrongs of the Post Office Workers' case, but I am praying that the strike will be averted or that God will provide for our financial needs in some other way. He's been faithful to us in the past and I have every reason to believe that He will continue to care for us. "And my God will meet all your needs according to his glorious riches in Christ Jesus." (Philippians 4 verse 19)

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Hardware & Software Available

• **Arc-PCB** – A program for design and draughting of multi-layer printed circuit boards with facilities such as auto-routing, zoom, pan etc. Output either to a plotter or Epson compatible printer. Demo disc £5 (refundable), full package £195, both inclusive of VAT and p & p from Silicon Vision Ltd.

• **Weather Satellite Decoding Podule** –This new podule from Spacetech decodes and displays information from weather satellites giving 84 grey scales and 256 colour palette. Software allows weather animation and includes some digital signal processing and image processing. Full package £259.95 inclusive. Send for a demo disc for £5 (refundable). Also available soon is a utilities disc including more advanced image processing (£35). Spacetech also sell the receivers and antennae that you will need to complete the system.

• **Image Processing** on Public Domain. Delft University have produced an image processing package and have made it available on public domain. It was originally produced on the Atari but has now been ported across to the SUN and the Archimedes. Facilities, amongst others, include contrast and edge enhancement and all are available through the user-friendly WIMP environment. The package has been developed in co-operation with Eeckhorn Computers B.V. and the local dealer, E.C.D. in Delft. More details from Eeckhorn on telephone 31-15-569365, or through ECD, Voldersgracht 25-26, 2611 E V Delft, Holland. (We have a copy if you want to send us a disc, but the documentation is too long to copy.)

• **More colours for Leonardo!** – Beard Technology's Leonardo, the mode 12 art package has now been up-dated to a 256 colour version. For only £2 more than the original version (£19.50 instead of £17.50) you also get a font generator and a printer dump routine – in addition to the impressive array of facilities of the mode 12 version, e.g. full zoom facilities, undo (and re-do!) option, compressed screen save format as well as the usual line, circles, ellipses, rectangles, triangles, fill, airbrush, etc. – See the review of Leonardo 12 on page 28. (We hope to have a review of Leonardo Plus next month.)

• **Arctist Plus** from Fairhurst Instruments (£19.95 or £5 as an up-grade) available "mid-September". Extra features wil include: mouse snap to grid, information bar, first colour to second colour, grab a frame (with Watford Digitiser), true circle, shaded spheres and rectangles, magnify area, reduce area, load new fonts, bold, underline and shadow.

• **Pax 256 Colour Art Package** – Julian Rockey of Quazer fame has turned his hand to artwork. All the usual art facilities including rubber-banding, zoom, undo, anti-aliased fonts. £15.95 inclusive.

• **Pipedream Demo Disc** – £4.95 inclusive from Colton Software – demo disc so that will give you the flavour of Pipedream. The £4.95 is recoverable when you buy Pipedream itself. (£5 including p & p through Archive, Pipedream £105)

• **Archimedes Utilities** from P.R.E.S. – A low priced toolkit package with facilities such as hard disc backup, memory allocation map, continuous compacter, screen mode table generator, file-type lister and module interrogator.

• **Another 4-slot backplane** (two, in fact). Firstly there is one from Atomwide at £49.00 +VAT without a fan or £59 +VAT with a fan (+£5 carriage per order) and secondly, IFEL Electronics are selling one with a fan for £58.95, including VAT & UK postage. IFEL has an upgrade scheme for those of you who already have a 2-way backplane and they also offer a discount of 95p for Archive members quoting their membership number. The 4-slot backplane mentioned briefly last month from Computerware is available at £59.95 including the fan. This includes UK postage, but they aren't VAT registered, so there is no VAT to add. (Computerware are also planning to release a 20 Mbyte hard disc podule for £399.95 in mid-October.)

• **Personal Accounts Package / Shares System.** Ian Hamilton is selling a pair of programs which can be used separately or together for single or multiple users. They provide personal accounts and a shares system to hold information about shares and unit trusts. The share system also has the facility to record buy and sell transactions to build up a share portfolio. (£15 or £12 if ordered before Christmas.)

• **Genlock Card.** Atomwide, in addition to their 4-slot backplane and prototyping expansion podule (£15 for a bare p.c.b. and £35 fully constructed – see Archive 1.9, page 3) also produce a genlock card for £175 + VAT. Lock your Archimedes video onto any other (mono) video source.

• **More games... Alerion** – Arcade Action game – £14.95 from Dabs Press, bears certain similarities to Quazer, scrolling shoot-up-the-aliens type game – a bit slower but more colourful than Quazer, my boys say – noisier than Quazer, say I!. **Orion** from Minerva (£14.95) air to air combat interceptor – shoot up the aliens before it's too late. **Freddy's Folly** from Minerva – £14.95 – a battle between Sir Freddy and yourselves. You are trying to defend your castle while he tries to bomb you from his fleet of balloons. (Well, it's a 'different' scenario!) "Lots of fun for all the family."

• **Archimedes Librarian.** Micro Librarian Professional is a library management program from Micro Librarian Systems who have had a system running on the Master 128 for some time now. This is an up-graded program using the full Archimedes features, not just the same program transferred onto a 3.5" disc. The basic price is £300, but for a further £200, the software can be customised to suit individual library's needs.

• **DOC Professional** (Database, Organisation, Charts) is a database written by a German firm, BSG – Digitale Illustrationen, with alternative text in English, German or French. The cost is £31.60 including postage and packing. (I think these facts are correctly interpreted from their press release!)

• **Desktop Enhancer** – an impressive array of extra facilities to bolt onto the desktop – reviewed on page 40. Available from Mitre Software for £29.95 inc VAT.

'WIMP Template Editor'

Write your own programs using the WIMP environment without having to understand all those complicated SYS commands that Adrian Look has been trying to explain to us for the last 'n' months. This is a program which uses the WIMP environment to allow you to design WIMP layouts. You then just load them into your own programs. It includes windows, (pop-up) menus, palette editor and sprite editor.

Acorn have given us a 'nearly working' version and we are in the process of knocking it up into shape. The idea is to release it as public domain software probably at the usual Archive disc price of £3.

Review Software Received...

Apart from reviews already written we have received review copies of the following software: Personal Accounts and Shares System, Alerion Arcade game from Dabs Press. A

Comment Column

Subscription Renewal

Many thanks to those of you who renewed your subscription early – it has kept us from going into the red (so far!), but for everyone else who has received a renewal notice, it would make our lives much easier administratively if you could renew before the next issue is due to be sent out. If you haven't had a renewal notice, it should mean that your subscription has not yet run out, but if you know different, please let us know – we're not infallible! Please bear with us. Thanks!

Remember that from 1st September, 1988, the subscription rates are £14.50 in the UK, £20 in Europe, £25 in the Middle East, £28 in America/Africa/Asia and £30 in Australia/New Zealand.

New Girobank Account

To make life easier for overseas Archivists especially, we're in the process of setting up a Girobank account. They still charge a commission for transferring money but not as much as banks, and I understand that in some countries (especially Holland where the majority of our overseas readers live) it is much easier to pay money through Giro. We still have to pay £1 commission on Sterling Giro transfers or £2.50 for non-Sterling transfers, so don't forget to add that to the amount you send. So the formula is take off 15% VAT (except for books and the magazine itself), add £1 commission (or £2.50 if you are using your own currency) and add something extra for postage, especially for books – e.g. the Ginns' book costs £2.77 to send to Europe. We will send details of the new account as soon as possible. (Hopefully, we'll put it on the order forms which are printed several days after the magazine.)

More subscribers, please

We still have less than half the number of subscribers that RISC User has. Do you think that Archive is good? Well, why not help to make Archive more widely known? A couple of months ago, we sent details and a free copy of Archive to all the Acorn dealers, but not all of them deal with Archimedes, so it's an expensive way of advertising. Can you help by telling us which dealers **do** sell Archimedes? – apart from the obvious ones who advertise in the magazines – then we can send them some more subscription leaflets. Thanks.

Come and see us at the Show!

Archive will have a stand (again) at the BBC Micro User Show at the New Horticultural Hall, Westminster, November 11th – 13th (stand number 2, as usual). We're hoping that several of the contributors will be on the stand at various times, so come and talk to them, share ideas, or show us the latest prize piece of software you have written.

Archimedes Olympics

I think we ought to have an Archimedes Olympic games at which people like Minerva Systems, Computer Concepts and Colton Software could battle it out in a fair test of speed. There could be classes for spreadsheets, word-processors and spelling checkers.

This thought was prompted by the news that Colton Software are saying that their spelling checker, soon to be released for Pipedream, checks at over 40,000 words per second – over four times the speed of BBC SpellMaster and over three times the speed of Archimedes SpellMaster.

We want Wordwise Plus!

A number of folk have commented that they would like an Archimedes version of Wordwise Plus. They are missing the ability to manipulate text – intelligent editing, particularly. There is a version of Wordwise Plus that runs under the emulator (£30 through Archive for the full package, including manuals, or £10 as an upgrade if you quote your BBC Wordwise Plus registration number) but people really want a native mode version making best use of the Archimedes' speed and memory capacity. All I can say is that Adrian Look is looking into the possibility of doing something along those lines – it's no small project, but if you are interested, let us know what sort of facilities you would like.

Copy protection

Should software suppliers put copy protection on their software? Well, as someone who has, in the past, produced commercial software, I can understand why some software houses do use copy protection – I'm sure we can all understand their feelings – but is it worth the aggravation it causes?

Who protects?

Minerva's technique is to allow you to make a copy of the original disc, but each time the program starts up it asks you to insert the original disc just to check that you have got one. This seems a reasonably sensible approach because, with so few accesses, it is unlikely that the original disc will get damaged and if it develops a disc error they will replace it free of charge. (If, however, you spill a cup of coffee on it, or whatever, they reserve the right to make a handling charge.) If you don't like the idea that you might be without your System Delta while they replace it, they will sell you a second copy which you can keep somewhere safely away from the computer. The charge is £25 + VAT.

They will also sell you an unprotected disc! For example, you can buy an unprotected version of System Delta Plus for just £199 + VAT. These discs are only available direct from Minerva and are doctored so if they find pirate copies, they know who to sue! The idea behind that policy is that if you are an organisation that wants to use it on a number of machines, you just pay your £228.85 instead of having to pay several lots of £69.95.

Beebug's solution, on Hearsay, at least, is to provide a program on the original disc that allows you to 'install' the programs onto one other disc (which could be your hard disc) before the installation program itself disappears into thin air!

EMR's software is protected. You cannot make a copy but they say that if it gets damaged, you should send it back and they will replace it. Whether they make a charge for replacement and how much they would charge depends on how it got damaged.

Dabs Press' new arcade game, Alerion, is protected, but it says that "If this disc ever fails to load, it will be replace free of charge". No need to worry about coffee spillages there!

Software from **Clares, Lingenuity, Colton Software** and **Acorn** is all completely unprotected but they would be prepared to take legal action against anyone they found copying their software for other than their own personal use.

Why protect?

On an 'open' machine like the Archimedes, there seems to me to be very little point in using copy protection. Anyone who WANTs to copy the software in order to break the copyright can do so easily enough anyway. It's the honest people who suffer. They get fed up with having to insert the original copy of the disc or having to wait while the computer churns away, finds a rubbished sector and reports this to the program which then ignores the error and finishes loading (which is why the Minerva games take so long to load).

I have a good mind to publish a program on public domain which allows you to copy protected discs, asking only that the purchaser of the copying program signs a form to say that it will only be used to break protection on software purchased by that person for his own sole use. To do so would not, in my view, break either the letter or the spirit of the copyright laws, but no doubt I'd get jumped on from a great height by certain people! A

Readers' Comments

• **Disc Drives for MS-DOS use.** I have been trying for some time to get the MS-DOS emulator to read 360k discs without success despite helpful advice from the Archive office. Beebug were able to solve the problem! They told me that the 40-80 switchable Mitsubishi drives I had bought from Watford Electronics would not work with the emulator even though they worked perfectly with BBC's and the Archimedes in ADFS mode. I exchanged it for a Cumana drive and all is now OK. I can read MDDOS 360k discs! (David Palmar, Glasgow.)

• **5.25" Disc Interfaces.** I bought a 5.25" disc interface from Beebug. For the first few minutes it seemed to work but then it stopped and the 3.5" drive on the computer would not work either. I took the computer back to Beebug who discovered that the disc controller chip had been destroyed! When I questioned whether their interface was at fault they said that my disc drive wasn't suitable. I then took my disc drive over to Watford, who were very helpful and let me try it on their interface and their computer. It seemed to work OK, so I bought one of their interfaces. Since then it has worked faultlessly, so I am writing to warn potential purchasers to try **your** disc drive on **their** computer before you buy an interface. (R.Cheung, Kingsbury.)

• **IBM Compatibility.** As the real world outside is IBM, it is necessary for the Archimedes to attempt to integrate as much as possible while still offering a performance/price relationship that is better than the clone manufacturers. I think that Logistix, and software like it, shows the way as it uses the same user view as the PC product with the same file structure whilst being a lot faster. To this end, I think that commercial software producers for the Archimedes should maintain file compatibility with PC software as an essential pre-requisite, e.g. Lotus 123 format or comma separated value format etc. An essential product that is required is ARCDOS. This would enable DOS discs to be used on an Archimedes in a transparent way and enable people to save files on a PC and put the same disc into the Archimedes with no further messing about. Fileswitch, as documented in the PRM, has 'hooks' built in to permit this to be written by someone with the necessary abilities. Perhaps someone like Clares' could do it? (Peter Smith, Crawley)

• **SigmaSheet/Pipedream/Inter-Word.** What an irony, says David Palmar, I wrote a SigmaSheet sorting routine which was published in Archive and now I shall never use it! I've bought Pipedream which copes with all my sorting needs and far outclasses anything similar I have ever used. Pipedream is great for school admin (budgeting, class lists, pupil marks) but for use by pupils and other staff, I still think Inter-Word is the easiest and hard to beat as a general word processor.

• **Clares' software.** Am I alone in thinking that Clares are the only software house who have the right attitude to the Archimedes? They are consistently enthusiastic with bags of ideas and

price spot on. Also, they seem to be the only ones making lots of use of the WIMP environment, one of the main attractions of the machine. AND, no copy protection – ideal for when we upgrade to hard discs. Hats off to Clares – let's have more point and click! (C.J.Hayes, Lancing)

• **System Delta Plus, SigmaSheet and PipeDream.** I find both System Delta Plus and SigmaSheet very user-UN-friendly and if it weren't for Archive's reviews, I would have thought I was alone in not being able to read the manuals correctly. Despite phone calls and a letter to Minerva they still did not answer my queries – but then they were exactly answered by Rob Brown's article. I may now give this software another chance instead of throwing it in the bucket as I have been sorely tempted to do several times just trying to get the Transfer facilities worked out.

Pipedream on the other hand is excellent and very good value for money. The manual is an example to others and there are many nice 'friendly' touches to the program that make it a delight to use. I would have liked more comprehensive search and select – one cannot select records and place them in an output range in the same file, although one can extract them to another file. (P.A.Hughes, South Ealing) *(I'm not sure if this last comment is correct. You can certainly create a file of, say, items >10 and <100, or such-like. Ed.)*

What do you think?

Strongly polarised views (not ours, I hasten to add) but do you think they are fair? For example, let's have some success stories about the use of Minerva software – we've certainly sold a lot of copies of System Delta Plus and I know many people are using it OK. Which companies give the best after sales service?

Let us know what you think. Ed. A

Basically, to "lose" the font, a call should be made to "Font_LoseFont" supplying the font handle.

e.g. SYS"Font_LoseFont",handle%

I hope this clarifies any outstanding points. I would like to thank John Smith who raised this, and other, points on my article, and Paul Beverley who was kind enough to supply the feedback. A

Matters Arising

Fonts For Idiots Revisited

Keith Milner

After my "Fonts for Beginners" article in Vol. 1 No. 8 of Archive, someone commented on the use of transfer levels in the font programs. I feel that I must clarify the situation. First and foremost, there is an error in the programs I submitted with the article. All I can do is apologise and give the necessary amendments.

Transfer levels

The problem is that, originally the VDU call to set the palette up required that the transfer levels had been previously defined. With the SYS version, the "Font_Set Palette" call actually sets the transfer levels to default values for the mode and number of colours you are using. This means that you can forget about transfer levels completely, or modify them AFTER setting up the palette. In order to achieve this, do the following modifications:

Listing 1: Font_demo
move line 380 to line 580
Listing 2: Anti_alias
move line 180 to line 315
Listing 3: Paint_type
move line 190 to line 205

Now, altering the transfer level values will produce some change in the font.

It is not really necessary to mess around with transfer levels but in my article, I felt their use would give a better insight in the use of fonts.

Lost and Found

The second point raised is that of "losing" fonts (well you did "find" them originally!). It is true to say that after using a font, it should be "lost" (similar to closing a file after use). In my article this was not covered for two reasons: firstly the fonts were left "found" so that the reader could list them with *FONTLIST as stated in the article; secondly, the original article did mention SYS"Font_LoseFont", but the article was looking a bit long, and this (and another couple of sections) were deleted.

Hints and Tips...

• **PipeDream** – For those who have not used View etc and who have therefore not had to fight printer drivers, the following may be useful:

The printer driver is loaded on initialisation and when <Alt><P><D> is used, but NOT when a document is printed, so any changes made to a printer driver are not acted upon until either of these events. It's obvious really, but if you haven't registered the fact, it could cause a lot of confusion.

For those who wish to use bold throughout a document, (e.g. for producing something on a dot-matrix printer that will go through a Fax machine) it would seem an obvious solution to put markers at the beginning and end of the document and make it all bold highlight. However, this is **not** a good idea because your printer will have to cope with double printing each word, one word at a time! Instead, change the printer driver so that the bold highlight is NOT cancelled at the end of a line. i.e. change the Y to an N and either send the necessary ESC sequence in the PON line or put a highlight 2 at the very start of your text.

• **Transferring character definitions** – If you have files produced by the CHARDES program from the Master Welcome disc (mentioned last month, page 34) here is a little BASIC program to run the files on the Archimedes:

```
 10 REM >ThinChar
 20 CLS : INPUT "FileName ";A$
 30 OSCLI ("LOAD "+A$+" 12800")
 40 FOR I=127 TO 32 STEP -1
 50 VDU23,I
 60 VDU(?(&12844+I-32))
 70 VDU(?(&128A4+I-32))
 80 VDU(?(&12904+I-32))
 90 VDU(?(&12964+I-32))
100 VDU(?(&129C4+I-32))
110 VDU(?(&12A24+I-32))
120 VDU(?(&12A84+I-32))
130 VDU(?(&12AE4+I-32))
140 NEXT
```

• **Quazer (again).** The fix for Quazer 1.42 is ?&3D090=Nº of lives, ?&3D98F=&F2, *SAVE Quazcode 9000 +365AC, *settype Quazcode FF8.

• **Printing in binary** – PRINT ~number% prints number% in hexadecimal but there isn't an equivalent for printing in binary. However, there are SYS commands that will do it for you. The following program illustrates the use of SYS &E0 which converts a number to a four byte binary number string (SYS's &DF, DE and DD convert to 3, 2 and 1 byte binary numbers).

The only other point of interest in the program is the way that the leading zeros are stripped off by lines 190, 200 (which can be omitted, of course, if you want the leading zeros!). The INSTR command finds the position of the first "1" starting from the left hand end of the string, take off one to give the number of zeros to be removed. The LEFT$ command at line 200 turns those zero characters into the character set by pad$. (This illustrates the fact that you can use string functions on the left hand side of an assignment.) If pad$ is a space character, the binary numbers produced will all be the same length and so will be right justified but if you want the strings left justified, you can set pad$ to CHR$0. (An alternative for left justification would be to use numb$=RIGHT$(numb$,32-n%).)

```
 10 REM > BinPrint
 20
 30 pad$=CHR$0 :REM left justif'n
 40 pad$=" " : REM right justif'n
 50 OS_ConvertBinary4=&E0
 60
 70 REPEAT
 80   INPUT "Number? "number$
 90   number%=EVAL(number$)
100   A$=FNbinconvert(number%)
110   PRINT A$
120 UNTIL0
130
140 DEF FNbinconvert(numb%)
150 LOCAL numb$,n%
160
170 SYS OS_ConvertBinary4,numb%,
              32,numb$ TO numb$
180
190 n%=INSTR(numb$,"1")-1
200 LEFT$(numb$,n%)=STRING$(n%
                          ,pad$)
210 =numb$
```

• **Hard Disc Head Parking** – Don't forget that if the RFS is selected, it will accept the *BYE command but it will not park the heads on the drive. You have to be in ADFS.

• **Screenload/save** – It is interesting to compare the time taken to save and load screens using *screensave and *screenload with the time taken to define the whole screen as a sprite and save it using *Ssave or load it with *Sload. In all modes there is considerable saving e.g.

	Mode1	Mode12	Mode 15
*Screensave(load)	7(4)	25(18)	52(38)
*Ssave(load)	1(<1)	3(3)	7(6)

• **Libraries and *mount...** If you *mount a disc, the library from the previous disc remains in memory. For those with a single drive, this may seem a nuisance but the reason the library is not changed is that you can have a library on one drive and shove discs in and out of the other drive without losing the library – particularly important with hard discs. Obviously you could reselect the library with *library $.Library but it is much easier to use *bye. That way, you don't even have to use *mount.

• **Reliable RS423 transfer from BBC's.** This is mostly just reiterating what has gone before, but to transfer reliably from BBC to Archimedes at 9,600 baud you need to [1] use the 1.24 serial patch (on Archive program disc 7) [2] Set *Configure DATA 5 (i.e. 8 data bits and 1 stop bit which is the default on the BBC) and [3] connect the BBC's RTS output to the Archimedes' DSR input (pin 6) instead of the CTS input (pin 8) and link pins 1, 4 and 8 together.

• **View A3.0** Further to the patches given in July issue (Vol. 1.10 page 6) Richard House reckons that instead of using &FF's in the various locations you should use &00's. (If someone has a working version of A3.0, please send it in so that we can add it to our collection of working patches!)

• **Viewstore 1.1** – Following on from the July Hints & Tips, not that not only should &ABE2, 3 and 4 be set to &EA, but also, the LDA #&82, JSR OSBYTE (&A9, &82, &20, &F4, &FF) routines need to be altered as with View A3.0. These occur at locations &A256 – A25A, &AA22 – AA26 and &AB98 – AB9C. The code required in each of these locations is &A2, &00, &A0, &00, &EA. (LDX #&00, LDY #&00, NOP). *(If you can't cope with these technicalities, send us a disc with Viewstore 1.1 on it and we'll modify it for you.)*

• **Correct Nesting?** To check that the nesting of loops, IF's and CASE's is correct within a program, use LISTO2 and LIST the program. If at the end of the program, the final line has two or more spaces after the line number, you've got an incorrect nesting somewhere. To check through, there should be no spaces between line numbers and DEFPROC's, DEFFN's or ENDPROC's.

• **Marconi Trackerball.** Archimedes' mouse's tail can apparently be removed, so says Mr T A Doncaster, and plugged into an identical connector within the Marconi RB2/PC-1 tracker ball and all works without any further fiddling about. Watch that the supply polarity is correct though.

• **Readable zeros.** In InterSheet in particular, I find the slashed-zeros misleading – they can easily be mistaken for eights. If you re-program the zero character using a VDU23 command you can avoid the confusion. It does increase the possibility of confusion with a capital-O but that is far less important in spreadsheet work than confusion with 8. So, I store the following program in the RAM on the RFS and call it up with *IS<return>:

```
10 REM >RFS:IS
20 VDU23,48,60,102,102,102,102,
                          102,60,0
30 CHAIN "RFS:ISHEET"
```

No doubt you could modify this program if you wanted to use the same re-programmed zero character with other spreadsheet software.

• **Computer salutions.** R.E.Boldero, in the July edition, asked for a way of getting his computer to greet him each time he switched on. The next hint shows a partial solution.

• **RFS Boot file** – If you use a ROM podule with battery backup, you can create a boot file that runs in the RFS and sets up all sorts of goodies. I used to have a BASIC program called !BOOT which set up all sorts of things on power-up or <ctrl-break> but if you are developing a BASIC program, get stuck and press <ctrl-break>, you lose the program because it is replaced by the boot program!!!!! After Adrian had fallen into this trap a few times when

using my computer, he developed the following rather ingenious (not to say devious) EXECable boot program. (*Configure Filesystem RFS, *Configure Boot and *OPT 4,3 in the RFS.)

We have since added a facility for making Arthur talk to you a bit more politely, from an idea sent in by Chris Hayes.

To create the boot file, I start with the following Wordwise Plus file which is then spooled as "RFS:!BOOT". (The line numbers are purely for discussion purposes.)

```
 1 <gr>LL160<gr>PC "~"
 2 VDU21
 3 VDU6,11,32,32,32,32,32,32,21
 4 VDU6,19,0,4,0,0,0,21
 5 VDU6,19,1,0,0,0,0,21
 6 VDU6,13,11,11,11,11,11,21
 7 VDU6:COLOUR 6:VDU21
 8 VDU6:PRINT"N o r w i c h  C o
   m p u t e r  S e r v i c e s"
                          :VDU21
 9 VDU6:COLOUR 7:VDU21
10 *SETCLI$PROMPT <13><10>Good
                        Morning! *
11 *IF SYS$TIME LEFT 2>11 THEN SET
        CLI$PROMPT <13><10>Good
                      Afternoon! *
12 *IF SYS$TIME LEFT 2>18 THEN SET
        CLI$PROMPT <13><10>Good
                        Evening! *

13 *KEY0 *MOUNT 0|M*FREE|M*CAT|M
14 *KEY1 etc...
20 *KEY12 *FORMAT 0 D|M

21 *SET Run$Path ,ADFS:$.,RFS:$.
                                ,%.
22 *SET Alias$> CAT

23 *FX255,8
24 *ADFS
25 *BASIC<gr>OC6
```

The LL160 command (1) ensures that the command lines are not split up and the PC command ensures that the pad characters are sent when spooling the file. (2) switches off the screen display, but since

this actual command appears on the screen, (3) moves up and wipes it out again! (4) and (5) change foreground and background colours (6) moves the cursor back up the screen, before printing out a welcome message in a different colour, (7 & 8) and switching back to white (9). The IF SYS$TIME commands then sets up the Arthurian prompt (normally a star on its own) to be something a bit more timely. (This doesn't automatically change the greeting as the time of day changes, it gives you the greeting that was appropriate last time you pressed <ctrl-break>.) The function keys are then programmed, the runpath is set up etc (21 – 24) (See Archive 1.7, page 8) before BASIC is invoked with an OC6 to re-enable the screen.

(You could create it by making it a BASIC program that started...

```
*SPOOL RFS:!BOOT
PRINT"VDU21"
```

and ended...

```
PRINT"*BASIC";CHR$(6);
*SPOOL
```

I haven't tried this BASIC version, but I presume it would work.)

• **Keyboard repeat speed.** You may have noticed with First Word Plus or other wordprocessors that when pressing <return> on auto-repeat it cannot keep up and, when you take your finger off the key, it goes on spewing out returns until the keyboard buffer is empty. You can avoid this by reducing the auto-repeat speed with, say, *Configure repeat 15 (instead of the default of 8) and then pressing <ctrl-break>. (It should really be called the auto repeat **time** as the number is the time in centi-seconds between repeats.) Instead of changing the configuration, you may prefer to could add a *FX12,15 command into the !BOOT file and then press <ctrl-break> after your WP session to restore the default repeat speed.

• **Disappearing cursor in EDIT.** Have you noticed that if you hold the cursor key down in the BASIC editor, the cursor disappears so that you can't see where it is on the line? Try changing the auto repeat speed as mentioned in the hint above – doesn't always work, but it seems to make it better if you have a faster speed (smaller number in the command).

• **Auto indenting in EDIT.** Some people like to put the indenting into the program itself to show the structure (as opposed to using LISTO3 to show the structure when you list it). If you are using the ARM BASIC editor, you can add the spaces automatically as you type in the program. What happens is that if you put a number of spaces at the beginning of one program line then, when you press <return>, the new line has the same number of leading spaces as the line before, so until you reach a REPEAT or UNTIL or FOR or NEXT etc, you just press <return> and type the next line without thinking about the indenting.

• **Disappearing programs in EDIT!!** On the BASIC editor, if you edit a line that occupies more than one screen line and make it shorter, it may leave a blank line on the screen (no problem – this disappears as soon as you move the cursor away from that line). If you then press <return> to create a new line, the new line goes in the gap left by the editing (still, apparently, no problem). However as soon as you try to use any of the move, delete, or copy functions, all the line numbers go wrong and cursor movement becomes rather unpredictable. Indeed, if you move down the program, you will find that when the line that was edited moves off the top of the screen, the scrolling continues and the program disappears into oblivion! (Reset and OLD will recover your program intact.)

The solution is, if you get a line gap, either re-number (which happens automatically if the line numbers were already consecutive) or move down a line then back up again before pressing <return>.

• **Pencil for Artisan.** If you want to add a 'pencil' facility to Artisan, the joined-lines function can be made to provide this in the following way. (1) Using a copy (not the original!!) of the Artisan disc, enter the BASIC editor and load ART5. (2) Use Search and Edit to find DEFPROCKB. (3) Alter the procedure so that it looks like this:-

```
DEFPROCKB
LOCAL X%, Y%, B%
IF J%=6 AND CLARE%=-1 THEN
MOUSE X%,Y%,B% :ENDPROC
ELSE
REPEAT:MOUSE X%,Y%,B%:UNTIL
B%<>BB%:ENDPROC
ENDIF
```

(4) Save this as ART5. (5) For completeness, use the Welcome utility, SEDIT, to change the joined-lines icon into a pencil icon. (6) Now, with the joined-lines function selected, holding down <select> draws a continuous line. On releasing <select>, the normal rubber band line appears, but it can be released by pressing <adjust> once. Pressing <adjust> again carries out the UNDO function.

(While on the subject of modifying Artisan, note the short addition in Acorn User, April '88 which adds an airbrush effect.)

• **Star LC24-10.** If you are having problems with getting a Star LC24-10 to accept output from First Word Plus or Graphic Writer, check the EPROM chip in the printer next to the dip switches. If it has a label on it showing version 1.0, contact Star Micronics and they will supply a free up-grade.

• **Moving menus.** If you find that your menus keep moving about, drag the box down to the extreme bottom right corner of the screen until you can go no further. This makes them a little more secure – simple, but soothing!

• **Programming for speed.** Programs like EMR's SoundSynth and Minerva's Hoverbod and Missile Control are actually written in BASIC, with calls to ARM assembly language routines where extra speed is really necessary.

If you thought professional quality programs demanded assembly language only, think again! Perhaps there is a program you had thought of writing, but did not feel could be written in BASIC; the speed of the Archimedes has changed all of that.

Your strategy should be to write the whole program in BASIC first and then see which routines need replacing with assembly language in order to provide the right response times.

Mike Ginns' recent book from DABS Press, "Archimedes Assembly Language", contains a large number of assembly language counterparts for BASIC statements (he calls them "templates"), and would be of great value if you want to try your hand at this sort of approach. Although the book has rather a large number of grammatical errors and is not quite as fully comprehensive as it claims to be, but is still a good buy at £14.95. (Ian Nicholls) A

First Word Plus Hints

• **Using PC's** – If you have access to a PC and a PC version of First Word Plus, you may be interested to know that you can transfer files between the two using the Getfile and Putfile utilities of the PC Emulator. You can even transfer supplementary dictionaries the same way.

• **Adding printer drivers** – It may not be very obvious how you add the extra printer drivers that we've provided on the program discs, onto your First Word Plus disc. Suppose you want the Kaga Taxan driver. Put in the program disc and type

```
*copy 1WP.cfg.Kaga_Taxan 1WP.cfg.* P
```

then change discs and press <space> as prompted. (Or use dual drives if you have them.)

• **Default printer driver** – If you want to make, say the Juki driver, the default so that it comes up with that as the driver when you boot up the disc, use:

```
*copy  $.1WP.cfg.Juki  $.Res*.
                       1WP.1wp_print F
```

The F in the copy command makes it over-write the existing default driver.

• **Paging problems.** You can now get a version of First Word Plus that obeys the command in the printer driver to stop at the end of a page to allow you to change the paper. Brian Carroll writes... "I returned my disc to Acorn and had it back by return of post with a clear and helpful letter. It seems that Acorn are at last getting the message about customer support. There are only two modified files: $.resources.1WP.1WP and $.resources.1WP.1ML, so for anyone who has done some work to configure their working master disc it would be simpler just to copy these two files across than to start again from scratch. The bug-fix works OK, so the printer drivers that I sent for Canon PW-1080A (program disc number 10) will work properly."

• **LQ1050** – You can add double height to the printer driver merely by using Search and Replace, changing 57 for 77 (double width for double height). It works fine – the only thing to remember is to set the line spacing to 2 in the ruler when choosing expanded pitch.

• **Large documents.** Beware when you are printing long documents (30 pages+) as FWP can get a bit confused and print the wrong pages. A

Help!!! and Help Offered

• **ArcWriter to First Word Plus** – Mr S Rizvi wants to know how to transfer files from ArcWriter to First Word Plus. Has anyone done so yet?

• **Intelligent *COPY** – Has anyone written, or would anyone be prepared to write, a routine using OS_FSControl which would copy all files that had been up-dated on a particular day (or prior to a particular day) so that you could backup those files on your hard disk that had changed?

• **Sound Level 1 interface.** Brian O'Carroll wants to output waveforms directly to the sound output without having to create a voice first – so that he can monitor the sounds as he modifies them. He reckons he needs a level 1 sound interface?! Any ideas?

• **Software incompatibility?** There seems to be some incompatibility in the way that different packages handle the mode 12 colours, e.g. a sprite made in Artisan with a white background appears purple in First Word Plus, making it difficult to type any text over it and see it. Similarly, in Presenter, a graph saved with a white background becomes black in Artisan – also, between GammaPlot and Artisan. Any ideas? says David Palmar.

• **First Word Plus printer drivers** – please send in any printer drivers you have written so that we can put them on the program discs and make them available to other Archive subscribers. Drivers that have been specifically asked for include: HP Laserjet Plus, Star LaserPrinter 8, Star NL10, Star Gemini–10Xi and Epson MX. (Extra ones we've got already are Canon and KagaTaxan on program disc 1.10 and Citizen 120 and KagaTaxan (from someone else) on program disc 1.11.

• **GLP printer drivers.** Has anyone got printer drivers for the GLP printer? It's supposed to be Epson compatible but it doesn't seem to work on graphics. (Peter Smith, Crawley)

• **Software conversion** – Is there any program that will convert keystrokes or joystick movement (on computer games) to mouse movements on the Archimedes? (Robin Davidson, Israel)

• **Seikosha GP700A** – Does anyone have a way of using a Seikosha GP700A colour printer on the Archimedes? (Robin Davidson, Israel)

• **Teletext Adaptor.** Does anyone know of one that works on UHF channel 29? (P. Green, Rotterdam)

• **Conqueror problems?** Ian Hamilton finds that at about level 11 of the strategy game, 'Please wait...' appears and the program crashes. Does anyone else have this problem?

• **Reprogrammed printer characters** – Does anyone have a program for re-programming the characters on an LQ 1050/850 printer? (W W Mapleson, Cardiff) *(Is the Small Ad on page 29 an answer to this one? Ed.)*

Help offered

• **Convert your Microvitec monitor.** Brain Carroll has details of a board which will convert a BBC style Microvitec monitor for use with the Archimedes. The board gives the full colour range, though not, of course, for the hi-resolution modes. The board costs £74.18 and Brian will give you full details. Send him an S.A.E. to 42 Manor Road, Aldershot, GU11 3DG.

• **Fujitsu multi-sync monitor** – Richard Cheung likes it very much and thinks it works well and is good value for money. The only problem is that the lead it comes with is not suitable for the Archimedes. If you can't find a supplier, he is happy to make one up for you for just £10. R Cheung, 48 Sunnymead Road, London, NW9 8BU.

• **Hard Disc Crashes** – If your hard disc has crashed and you need help to rescue the files, Felix Andrew has managed to write routines based on the HFORM program which could save you a lot of grey hairs! He found out how to recover files by crashing his own drive, so he endorses very strongly D J Morley's comments last month about taking regular backups! Felix Andrew, 19 Burbage Road, Dulwich, London, SE24 9HJ. (01-274–2642) (If writing, send him an S.A.E. and/or a blank disc.)

• **Hard Disc Backup.** Ian Hamilton has sent us a hard disc backup program which he "wrote in a hurry when I got my hard disc", so he confesses that the code is not elegant. However, it saves the contents of the disc onto several floppy discs on a file level so that it allows selected directories to be

excluded. The hierarchy is preserved, so to copy the files back again, you can do a *COPY :0.* :4.* ~CFR on each floppy. We have put the program on this month's program disc.

• **Econet** – With reference to the query in August Archive on Econet utilities *NOTIFY, *REMOTE and *VIEW, Robin Newman writes...

1 These cannot be implemented on the ROM based Econet modules in Arthur 1.2, or indeed in the two (to my knowledge) RAM based upgrades that Acorn have officially released. However....

2 Later versions developed by Acorn (I am currently running Econet 5.31 (2nd August), NetFS 5.40 (10th August) and NetPrint 5.23 (2nd August) add some extra SWI commands, notably SWI Econet_DoImmediate which allows commands like insert character in target machine input buffer, remote JSR, remote user PROC etc. to enable the BROADCAST command to function correctly, and cure various other early bugs e.g. with SWI Econet_ConvertErrorTo String. I expect that Acorn will do another official release soon.

3 Using these additions, I have written both BASIC and machine code version of *NOTIFY for Archimedes. The Econet commands for *REMOTE have NOT been implemented, as it doesn't make sense for an Archimedes to try and remote a Master or vice-versa as they are very different beasts. The network command which allows the screen parameters to be transmitted to facilitate *VIEW has also not been implemented. Again it is not sensible for Masters to *VIEW Archimedes and vice-versa. Also *View between Archimedes would take a long time, as 80k hunks of data would have to be transmitted.

4 Notwithstanding, you could very easily write a *FORCE command, (or a BASIC program) which would allow you to insert characters in another machine's input buffer (if it is not protected) and thus cause it to carry out commands remotely. Also PEEK is implemented, so you could write your own rudimentary *VIEW if you wished, and with a bit more effort (probably involving running remote code in the target machine using the remote JSR command) you could implement a more satisfactory version. I have written a crude *VIEW which enables an Archimedes to *VIEW an unscrolled Master Mode 7 Screen.

5 I am not prepared to publish details, because in the wrong hands, (i.e. pupils!) havoc could be wreaked, but I am prepared to send *NOTIFY, *FORCE etc to bona-fide network managers sending me a blank formatted disc, return packaging and postage and a request for the software on School/Institution headed notepaper. (Note you will still need to get the new Econet modules.)

6 The fileserver you use does not matter, as the communications are directly from machine to machine. The utilities should merely be stored in the Archimedes Library – probably ArthurLib – on the fileserver from whence they can be loaded and run.

Robin Newman, The Microelectronics Centre, Blackpot Lane, Oundle, Peterborough, PE8 4AT. (0832–73884) A

Language Forum – Lisp and Pascal

David Wild

Lisp for the Archimedes

After my experience with Pascal, I have found Archimedes Lisp to be something of a disappointment. There can be no doubt that this version is very much more powerful than that on the BBC Micro but, unfortunately, it is full of bugs and the manual is totally inadequate.

The problem with the manual is that, because there is no generally accepted standard for Lisp, it is difficult to work out what the system will do and what it won't. At least with Pascal if you don't understand the extensions you can write ISO standard programs and they will work.

The manual tries to list every function provided in the system and give a brief description of what it will do. I keyed in every example in the book and found that most of them worked, some did not do what the manual said, some didn't appear to do anything at all and some took control of the machine and left you to press <reset> to regain control.

If you make mistakes in typing in Lisp functions, you may get quite a useful 'backtrace' facility but it is never explained properly. Unfortunately you don't always get it and sometimes you have to leave Lisp. I typed (- 2 3), which I must admit is not legal Lisp according to this definition, and instead of getting an error message I found that the machine started one 'Garbage Collection' after another until I pressed <ctrl-break>.

I have written to Acorn with a summary of my findings and I will advise you what comes of this. In the meantime I cannot recommend this program to anyone who is not fully conversant with Cambridge Lisp on the 32016 machines. Even then it is not a good buy at twice the price of Pascal.

More about Pascal

As I have gained more experience of using Pascal I have begun to find minor difficulties – and opportunities – that are not mentioned in the manual.

In my earlier article, I mentioned the fact that there were one or two minor bugs but – at least so far – I have found that they cause no difficulty if you know that they are there. Happily, too, they all produce compilation errors rather than hitting you with a sandbag at run time.

- The first problem relates to the use of in-line machine code. If the last statement in a procedure or function is a machine code statement it MUST be followed by a semi-colon, even though the formal syntax of Pascal doesn't need it.

- A second bug has to do with the extended reset and rewrite statements. If you wish to use a variable to hold the file name then it MUST be a packed array of char, and the lower bound MUST be '1'. If you happen to make the lower bound '0' you will get error 145 "a string constant is required here". The odd thing is that the description of the error in the manual refers only to $include and alias statements.

- I also found difficulty in attaching text files to the file names by using these reset and rewrite functions. I first came across this problem when I wrote a program which needed to put some data to the printer and some to the screen. I put a file 'printfile' into the program header and then tried to attach it with "reset(printfile,'printer:')", which ought to have worked, but the compiler refused to do it.

After much struggling I found that I could attach the printer by omitting the reset function but calling the program with " *printprog -printfile 'printer:' ".

Recently I wrote another program which needed to read one text file and convert it to another, with both file names being supplied by the user. Again there was a great deal of struggling until Philip Colmer of Acorn let me have the solution. It seems that there are two ways of doing what is needed; you can either put the files into the program header and connect them with the "-infile filename" extension when you call the program or you can leave them out of the header (which leaves my file processing program declaring just 'input' and 'output'), declare them as variables of type 'text' and then use reset or rewrite as necessary.

The first method has advantages, especially for a file to take printer output, if you are going to provide an exec file, or an alias to help the user, but the

second method allows you to validate the file names, use the 'status' extension to check that the file actually exists and, where it is useful, to use the same file variable to cover multiple files. One such use is for merging several input files into one output file. At the end of the first you close it and then reopen the file with the second file in your list etc.

• It is not difficult to write a procedure 'gotoxy' or 'tab(x,y)'. A listing of one is given below and the Smith & Wiggins extension package includes another. One small point about using such a procedure is that any 'write' functions after going to a particular location on the screen must be followed by a 'writeln' function before attempting to go elsewhere on the screen. Apparently this is because of the way in which Pascal buffers its output.

• Although it is not actually an error to attempt to link modules which are not called by the program you are linking but the size of the linked program will be greater if you do.

• The dual buffer facility of TWIN can be very useful during the early stages of compilation, as you can go straight from the error messages in the compiler listing to the source and make the corrections. You cannot, however, run the compiled program from one of the buffers if it attempts to do things like clearing the screen. If you do try you will get some pretty patterns on the screen but they are not under your control and you may be reduced to pressing <ctrl-break> to recover control of your machine.

• Another useful facility, both listed in the magazine and included in the Smith & Wiggins compilation, is an 'OSCLI' procedure. Statements processed by this procedure can include 'echo' followed by parameters, thus giving an extended 'vdu' facility. For instance "oscli('echo |<19>|<0>|<4>|<0>|<0>|<0>')" will turn a mode 3 screen blue.

These hints should give you something to be going on with, and I will try to have more for the next issue of the magazine.

```
{
>$.languages.pascal.procedures.oscli
}
procedure oscli(incommand : packed
array[low..high:integer] of char);

const
   R0         = 0;
   OS_CLI     = 5;
var
   loopcount : integer;
   inaddress : integer;
   commstring : packed array
                     [1..255] of char;

begin
   for loopcount := low to high do
      commstring[loopcount] :=
incommand[loopcount];
   commstring[high + 1] := chr(0);
   inaddress := address(commstring);
   *LDR_R0,inaddress;
   *SWI_OS_CLI;
end;


{
>$.languages.pascal.procedures.gotoxy
}
procedure gotoxy(x,y : byte);

$include
'$.languages.pascal.procedures.vdu';

begin
   vdu(31);
   vdu(x);
   vdu(y)
end;


{ >$.languages.pascal.procedures.vdu
}
procedure vdu(inbyte : byte);

const
   R0         = 0;
   R1         = 1;
   OS_WriteC = 0;

var
   byteaddress : integer;

begin
   byteaddress := address(inbyte);
   *LDR_R1,byteaddress;
   *LDRB_R0,[R1];
   *SWI_OS_WriteC;
end;
```

BASIC V Utilities Forum

Clifford Hoggarth

Following on from last month's comments on output, I thought I would take a look at the opposite end of things – keyboard input.

Keyboard Input

Over the years, I have developed a general purpose input procedure, originally on a BBC but of late this has been enhanced using BASIC V on an Archimedes. It is not so much enhancement of the feature, but rather that the extra structures provided allow the routine to be more easily constructed and additions made without major reprogramming.

The routine is shown as listing 1. This is a simple routine which requires a string of valid characters and a maximum length for the input string.

Keypresses are monitored until a "valid" key is detected. Note that this means that the string of allowable characters MUST include control codes for <return>, <delete>, etc. The test for validity is by use of the INSTR statement. The character is then examined for 'special case' characters. This is where the CASE statement makes life much simpler, allowing any ASCII value to be extracted, suitably flagged and appropriate action signalled to the calling routine. This makes it fairly simple to detect keys for editing functions, etc.

The special characters used in this simple routine include the delete key (ASCII 127) which, if the string is greater than null removes the last character of the string using the LEFT$ function with only one argument to set the input string to one character less than its previous length. If there are no characters to be deleted a warning beep is given. Pressing <return> (ASCII 13) sets the variable, crflag, to the value TRUE. This is used to exit the main REPEAT loop when the string is complete.

If the key pressed is not one of these, the OTHERWISE option is executed. This tests string length and, if lessthan the maximum, adds the character to the input string using the += function. The routine then repeats until the <return> key is pressed.

By inserting other key values in the CASE statement, the routine can easily be altered, e.g. addition of ASCII 27 could be used to allow <escape> to be used to exit string input. Another possible adaptation is using the cursor keys (following *fx 4 1) to position the cursor within the string to edit existing text. This would also involve the string being built using the MID$ function rather than the simple += as characters could be altered in the middle of the string.

However, as I implied above, listing 1 is the simplest of routines but it is a sound base around which you can build more complex and specific routines. Two simple examples are shown in listings 2 and 3. Listing 2 simply returns a number rather than a string and listing 3 shows how the original function can be incorporated in a routine that prompts for input at a given position on the screen and in inverse video (two colour modes), as commonly seen in spreadsheets etc.

I have found that this method of input can be used in just about all circumstances and it appears in much of the software that I write. Much time can be wasted writing the input and output parts of programs and a library of useful routines is essential for rapid program development.

If you have written a comparable routine or one that deals with the even more complex subject of output or, indeed, any subject that may be of interest or help to others, please send it in because, at the moment, this is not so much a forum as a lecture. At least let me know what areas you would like to be discussed.

Hexadecimal and BASIC V

I have not seen it documented anywhere but BASIC V allows hexadecimal to be typed in lower case, i.e. &abcd is valid. "So what?!", I hear you cry. Well, those of us who started out with BBC BASIC on a Beeb will know that this was not allowed – hex had to be in upper case. Strictly speaking hex should be in upper case because, if you allow bases greater than about 40 (as in FORTH), lower case characters must be different from upper case characters. Hence you should really stick to upper case for hex, but it's nice not to get "Bad HEX" errors thrown at you because you didn't press the shift key properly!

(Note that in the listing overleaf, Clifford has used the equivalent of A$=LEFT$(A$) i.e. without a

length parameter. What this does, it seems, is to chop off the rightmost character. Thus PRINT LEFT$("abcd") produces "abc". It saves doing LEFT$(A$,(LENA$-1)). A useful idea in itself. Ed.)

Listing 1

```
DEF FNget_string(valid$)
inputstring$=""
crflag=FALSE
REPEAT
  REPEAT
    char$=GET$
  UNTIL INSTR(valid$,char$)
  char=ASCchar$
  CASE char OF
    WHEN 127
      IF LENinputstring$>0 THEN
        VDU 127
     inputstring$=LEFT$(inputstring$)
      ELSE
        VDU 7
      ENDIF
    WHEN 13
      crflag=TRUE
    OTHERWISE
      IF LENinputstring$<length THEN
        VDU ASCchar$
        inputstring$ += char$
      ELSE
        VDU 7
      ENDIF
  ENDCASE
UNTIL crflag
=inputstring$
```

Listing 2

```
DEF FNinput_number(xpos,ypos,length)
=VALFNinput_string(xpos,ypos,length,
                   valid_number$)
```

Listing 3

```
DEF FNinput_string(xpos,ypos,length
                                ,valid$)
COLOUR 0
COLOUR 129
PRINT TAB(xpos,ypos)SPC(length)
          inputstring$=FNget_string
                     (length,valid$)
COLOUR 1
COLOUR 128
PRINT TAB(xpos,ypos)SPC(length)
PRINT TAB(xpos,ypos)inputstring$
=inputstring$
```

GammaPlot – Far more than a 'Graphs' Package

Gerald Fitton

GammaPlot is yet another good package from Minerva which makes the most of the capacity of Acorn's new machine. They have written GammaPlot with their usual mix of relocatable modules for speed and BASIC for efficient coding. Import of data from Minerva's own databases and from most other formats is well catered for. The mode 12, 16 colour output is in the form of sprites which can be exported to First Word Plus, GraphicWriter and (dare I mention it?) Artisan. However, if you have the technology, the mode 15, 256 colour output is stunning and made me wish I had a colour printer. (I used 35mm and video cameras.)

If you want to convert numbers to charts, and do it with a style worthy of the Archimedes, then GammaPlot is the package for you. You can have many charts on one screen at the same time and place text in a variety of sizes and styles, including the Acorn fancy fonts, anywhere on the screen. You can create your own slide show of 256 colour screens and even use the mouse pointer whilst "clicking" through your sequence of slides. I was most impressed with the sheer professionalism of this package and I have no hesitation in recommending it.

How easy is it to get started?

The tutorial is a good one and covers the major features of the package. I was happily using the mouse and key driven menus of the package within an hour and soon afterwards started using my own data. Of course, as you would expect, a later study of the manual showed me how I could have speeded up some of the effects I wanted such as perfect superimposition of several sets of data, achieved by writing macros and merging customised screens. It is easy to get started and with practice you will be able produce some excellent presentations.

What can you do with it?

GammaPlot is primarily intended as a means of converting numbers to charts. At its simplest you can produce pie charts, histograms and (3-D) bar charts as well as line and scatter graphs from spreadsheet data. The charts, once produced, can be moved around on screen and scaled at the same time with a neat "Windowing" routine. Graphs and charts of different types can be displayed on the same screen even to the extent of superimposing one on top of another on the same graph.

Importing Data

One of my existing PipeDream spreadsheets contains the monthly unemployment statistics for about 30 years. I marked the block from 1974 onwards and saved the marked block as a "Tab" file in which the fields (columns) are separated by tabs and records (rows) are separated by carriage returns. I entered GammaPlot and loaded the data file containing over 110 points using the Load ASCII option. The main GammaPlot menu includes a Utilities option. From this menu you can import data from many different types of spreadsheet. I tried only the increasingly popular Comma Separated Value (CSV) format and it worked first time.

Direct Input and Display

I also tried typing data directly into GammaPlot and, after a false start, got to grips with its own spreadsheet. It consists of only 3 columns, so you can not produce multiple line graphs directly. However, this is no problem because graphs can be superimposed. Once I got used to the idea, I found this approach to have its advantages.

Pie charts show values or percentages against the labels in the first column. Bar charts can be produced in the same way. Line graphs plot y

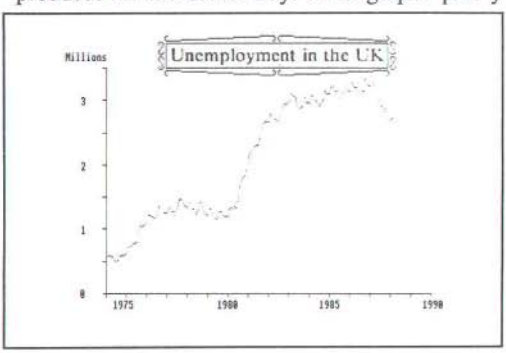


Figure 1

against x, the second column. Scales on both axes are generated automatically or can be selected. One neat touch is that if the second, x, column is all zeros then a linear scale is automatically produced such as that of Figure 1. Although the x column of my unemployment graph consisted of zeros I forced a scale of 12 because there are 12 months in a year. You can also plot y against x as a scattergraph and the software will draw the regression of y on x for you as well as calculating the correlation coefficient and both the standard deviation of the sample and the unbiassed estimator for the standard deviation of the x and y data.

Customise

I could have used the "Windowing" routine to scale this graph but I went straight into "Customise". With the aid of this package I deleted the numbers from the scales and replaced them with Years along the bottom and Millions up the side. There is a wide range of text fonts available including Acorn's fancy fonts and boxes to enclose them. It took me a total of 15 minutes, including the screen dump to produce the Unemployment graph, Figure 1.

Output

The screen dumps offered are Epson MX or FX mono, JX colour as well as the Integrex. There is an option to invert which, by default, is on. If you look at the graph you should see the doubling of the unemployment at the start of this decade and the recent fall. You may also be able to see the characteristic "double peak" each year in January and September. This "Seasonal Variation" can be averaged out in a spreadsheet. I have this data in a PipeDream file and imported this in the same way

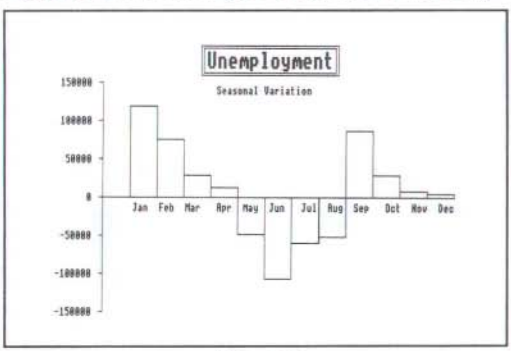


Figure 2

to GammaPlot – the bar chart, Figure 2, is the result. I worked in the 256 colour mode 15 but, after taking a colour photograph, I used the outline facility and flood filled with black before dumping to the printer, so I'm afraid you don't get the full effect.

Windowing

The "Windowing" routine allows you to scale a graph and move it around the screen. When the graph is shrunk, the text does not shrink as well, which is a good thing. This is because, at this stage, the graph is held as co-ordinates to be scaled and drawn on the screen, unlike the "Customise" package which paints pixel by pixel. I imported some weather data, Hours of Sunshine and the Mean Air Temperature as two separate sets of data. The two sets of data are held in two separate GammaPlot files but there is an option to display both on one screen at the same time. Once I had the two graphs where I wanted them I saved the

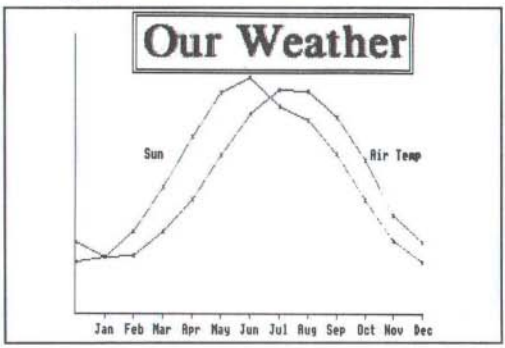


Figure 3

composite as a sprite and loaded it into "Customise". I added text in many different styles before settling of Acorn's Trinity for the title and Bfont for the axes. The result is Figure 3. It is possible to add as many different lines as you want, from different spreadsheets if necessary, moving them around, scaling etc. and modifying data or scales until you are happy with the composite graph.

Pie Charts and Highlights

Values can be "Highlighted". For a pie chart this feature pulls a segment out of the pie as shown in Figure 4. There are options to include or exclude percentages and labels. One thing I like is that the pie chart follows the recommended convention of

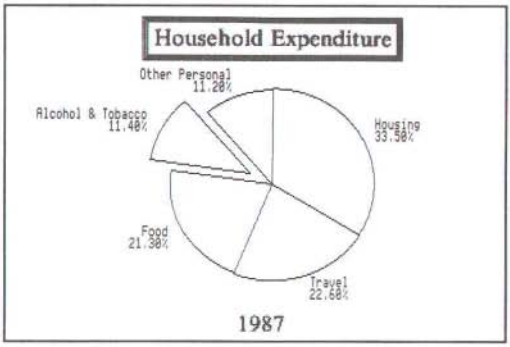


Figure 4

starting at 12 o'clock and working round clockwise. I sorted the data in PipeDream (largest first), so that the convention of starting with the largest percentage and working round to the smallest, is quite automatic. The position of the labels is also automatic and there are no overlaps or other problems that require correction by the user. Figure 4 has been scaled by "Windowing" and then "Customised". Once again I have a coloured photograph of this but flood filled the outline in black for the magazine. On a line graph, the highlight feature marks the point by drawing in vertical and horizontal lines to it from the axes.

GammaPlot's Good Points

1. The "Windowing" routines allow multiple charts to be scaled and placed anywhere on screen without damaging the text.

2. The "Customise" routines allow a wide range of text styles to be placed anywhere on screen and in a wide range of sizes including many smaller than those available in Artisan. I believe these smaller sizes are more suited to this type of application.

3. The "Customise" 16 colour mode can be exported to First Word Plus, (or to GraphicWriter) – there is even a single key method for doing this, but there is also a 256 colour mode which contains superb facilities for most presentation graphics.

4. There is a facility for making a "Slide" show of both mode 12 and mode 15 customised screens. I used my video camera to film a slide show I had prepared with this facility to produce some resource material for an Applied Statistics lecture. I think it looks good. If you haven't access to a video camera you can produce good photographs, particularly good are photos taken in 256 colours.

5. It would be very easy to make a slide show of some plotted functions. <Ctrl-g> generated data for the spreadsheet from every function, e.g. I tried combining sine waves of different frequencies and showing the effect of phase lead or lag.

6. I know that Minerva do not want this package classed as an "Art" package, so I'll just say "Try it for youself before you buy anything else!" I think you'll be pleasantly surprised.

GammaPlot's Bad Points

1. If you haven't got a colour printer then it makes you want to spend money on one. Seriously though, mono dumps can't do it justice.

2. If you haven't got a hard disc then you do have to be a bit careful dumping the 256 colour screens because they take up 160k each. Again, this is not the fault of Minerva but it does show that, to make the best use of such a powerful machine as the Archimedes, and associated sofware, a hard disc is not the luxury it once was.

3. You can not directly produce a multiple bar chart. However, the facility to overlay graphs overcomes this problem and, having tried it I believe that keeping each set of data separately has benefits.

Conclusion

I was most impressed with this software. It is fast, colourful, easy to use by itself and with other spreadsheets and wordprocessors. The output as sprites, screen dumps or as a slide show will, one way or another, cover whatever you may want to do by way of converting numbers to charts. If this is your major requirement then there is the bonus of being able to create or import sprites in 256 colours and use them to greatly enhance the professional look of your presentation. For my part I shall use the slide show extensively with my video camera to produce teaching resource material. The cost? Under £70 inclusive. A

(I got a bit confused last month with my Plots and my Pluses. GammaPlot was going to be £49.95 and GammaPlus somewhat more (£89.95?). However, GammaPlot has grown beyond its original specification and is now selling at £69.95 or £64 through Archive. Ed.)

Hearsay – Communications Package

Tim Saxton

Last month we looked at the first two Comms packages for the Archimedes, U-Connect and ArcTerm. They were first out as they were pre-releases, with some bugs left and the manuals not the final versions. Beebug, who have commissioned HearSay, did not adopt this approach but waited until the 'final' versions were ready before releasing. This inevitably delayed it beyond the others but, having had a week with Hearsay, I will give my initial impressions and take you through its features, comparing it with the other packages.

The following table is laid-out as the comparative table last month, so you can see at a glance what features are similar.

Basic Facilities

Terminals emulated	Viewdata (Prestel) ANSI VT220 VT100 VT52 Tektronix 4010/4014 graphics Teletype 80 char Teletype 40 char TTNS (added since review)
Modem drivers	5 drivers from dumb to Hayes
DIY drivers	Easy to implement, up to 4 extra
File transfer	X-Modem Protocols Y-Modem Y-Modem multi-file SEAlink Kermit ASCII

Extra Facilities

Auto logons?	Yes, any reasonable number of keyword/answer sequences
Time on-line display?	Yes
Off-line text editor?	Yes
Command language?	No
Spool screen?	Yes
Review Screen?	Yes
Parallel printer	Yes
Scratchpad?	No
Acorn RS423 patch?	Automatically installed
Dynamic display of BT line state?	Yes
Telephone directory?	Yes
Direct dial?	Yes
*commands?	Yes
Cost accounting?	Yes
Encryption of Phone Directory + passwords?	No
'Host Mode' facility?	No

Using the Software

The single very full disc supplied is copy protected, with two further working copies being allowed. There are very few disc accesses by Hearsay for program files during a session, so it is quite possible to mount a work disc after Hearsay has started. There is no limit to the use of the system, and disc and directory manipulation is easy to achieve, but because all the software and icons etc are loaded at the start of a session, the initial start-up is rather slow (30 seconds on floppies, 5 seconds with a hard disc). From then on, the response is instantaneous because no more disc access is needed.

Hearsay works from the WIMP environment and all functions are selected by the mouse. The function keys duplicate some of the more commonly used functions but excellent use is made of icons and the mouse and I had complete Prestel sessions without using the keyboard at all!

There are many nice touches that indicate how much thought and development have gone into Hearsay – for example, starting the program using "*hearsay Prestel" or "*hearsay Gold" etc will automatically get the parameters and numbers, etc from the entry called "Prestel" or "Gold" in the phone directory and call the number and log on! However a serious oversight with the phone directory is the almost complete lack of password protection, making use of the program in a school or college environment fraught with danger.

Viewdata

The Viewdata emulator, as with U-connect and ArcTerm, makes its own character set and screen size. It isn't the full screen size and has lots of icons in areas to the right and below. The character set is slightly quaint, with the vertical bar width of some characters being too great for my liking, but it is generally very acceptable, and the aspect ratio is correct. An attractive feature is the ability to select an option or page number from a displayed screen by clicking on it with the mouse – the option number or even page number (i.e. *12345#) being read from the screen and sent down the line! This is the ultimate in user friendliness and should do much to enable non keyboard literate people to join the IT revolution. Comprehensive screen editing is provided for use of IP's, and message sending couldn't be much easier.

File Transfer

File transfer via the usual Prestel scheme (CET) works very smoothly, with a window showing transfer progress. The error correcting protocol Vasscomm, used with the 2400 baud Prestel links, is included too, allowing error free screens to be ensured when it is activated.

The file transfer protocols supplied are comprehensive and will allow transfers to or from almost any source. My only disappointment being the lack of Z-modem, which has quite a few advantages, as outlined last month.

Terminal Emulators

The DEC terminal emulators (VT52, 100, 220) are very competent and almost complete, with smooth scroll and 132 column screens if appropriate. (The 132 column screens only show 80 at a time, the scroll bar has to be used to see the whole screen) Only downloadable character sets and a few obscure functions being missing. It was possible to perform wordprocessing using WPS-plus on a VAX system at 9600 baud with no problems.

There is an inbuilt text editor for off-line message preparation using the VT100 emulation.

The Tektronix graphics terminal emulator at first sight does not appear to be quite so good. The character lines are very close to each other, almost merging one line in with anotherand, when I tried it on a 3-D plotting program, their were quite a few problems, mainly to do with Alpha character positioning. The graphics were not bad, but not in colour and the resolution is nothing like a real Tek terminal. I would like more time to look at this, as I am not sure I have everything set up correctly yet, and I will report later on what I find.

Other facilities

Screen printing to a parallel printer (Epson or IBM) is well supported, with Prestel graphics and Tek screen graphics correctly shown.

Text spooling to disc and later replay are provided, as well as an on-line 256 line buffer to see previous screens, in a similar fashion to U-Connect.

A series of demonstration files are included on the disc, and you can replay Prestel, VT100 and a bulletin board session to see the performance of the system off-line. Also supplied is ARC, and a few other useful file manipulation utilities.

Documentation

The manual is excellent, housed in a loose-leaf A5 binder, it is some 200 pages long and contains everything the beginner or sophisticated user could require, except for one thing – there is no advice on how to connect the Modem to the Archimedes! Connection information for intelligent modems and dumb modems should surely be provided.

Which Comms software?

So what are the conclusions, with three entrants in the ArchiComms arena? For programs operating in the WIMP environment, U-Connect is now outclassed by Hearsay. The level of sophistication and yet user-friendliness of Hearsay is really very high and, in the short time I have had to appraise it, it appears bug-free. The non-WIMP ArcTerm has its 'Script' command language and the Host mode, together with the Z-modem file transfer protocol, so if you want to explore making your own bulletin board, then ArcTerm is for you. Otherwise, if the lack of password protection doesn't worry you, the choice between them is down to whether you like windows and mice or not!

Hearsay from Beebug at £69 (£63 through Archive)

U-Connect from Magenta Research Ltd at £59.95

ArcTerm from "The Serial Port" at £49.95 A

HEARSAY Archimedes Communications Package

The latest in communication software running under the Acorn WIMP environment featuring Viewdata, VT52, VT102 , Tektronix 4010, ANSI, and Teletype terminals and a wide range of file transfer protocols.

VT52 & VT102

full specification emulator including: advanced video options (bold, flash, italics, underline etc.), smooth scroll, replay option, save/load terminal status, command line editor, capture buffer for text grabbing, spooling & printer options, text editing facility.

ANSI

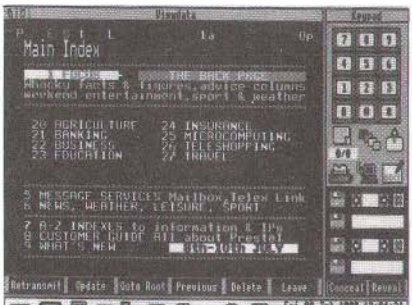
all VT100 options, but including ANSI colours and IBM character set.

VIEWDATA

full Viewdata support operated via the keyboard, on-screen keypad or by directly 'clicking' on the screen. Options include: screen dump (text or graphics), load/save frame, telesoftware downloading, frame send, Viewdata editor. A very powerful frame tagging facility allows tagged frames to be re-called, viewed, loaded, saved etc.

Tektronix

emulates Tektronix 4010 with a number of 4014 extensions. This implementation includes, alpha, vector, point plot, incremental point plot and GIN graphics modes.



Other features include:

- disc based telephone directory storing up to 100 entries per file
- XMODEM,YMODEM, Kermit, SEAlink, and ASCII file transfer.
- hard disc install utility
- all disc operations are directed through the file selector
- call logging facility
- Econet compatible version available - phone for details

Price £69 inc. VAT

Please add £2 carriage
Stock Code 0101C
Supplied on disc with user guide
Requires 1MB of RAM.

Modems Supported

Drivers are supplied for the following modems: Beebug Magic Modem/ Apollo/Voyager, Demon, Linnet (Hayes), Tandata TM512, Beebug Internal. In addition, the software can be configured to drive almost any intelligent modem which has auto baud-rate scanning.

Beebug Ltd. Dolphin PLace, Holywell Hill, St. Albans, Herts. AL1 1EX Tel. (0727) 40303
A number of cables for popular modems are available - please phone for details.

Programming with SpellMaster

Adrian Look

When you buy SpellMaster you get a 128k ROM and a green instruction book showing you how to use it. The manual contains a description of the star commands provided – and how to use SpellMaster in InterWord. When using InterWord, you can perform all sorts of functions: continuous checking, temporary 'word ignore' dictionaries, guessing words, etc. However, those of us who do not have InterWord cannot make convenient use of SpellMaster's excellent facilities. Or can we?

SpellMaster is implemented in the Archimedes as a module. This module looks up the main dictionary from the ROM but other user dictionaries may be installed in the RMA workspace.

Since SpellMaster is a module, it uses the SWI system for all its facilities, so by using these SWI's we can write BASIC or ARM code programs which allow us to use the features of SpellMaster.

'Spell_Typo'

*TYPO is used for correcting slight spelling errors. The command generates a list of words which can be obtained by transposing two letters or adding/subtracting a letter from the original word. This is very useful as a high proportion of spelling mistakes are of this kind.

```
DEFPROCtypo(word$)
SYS "Spell_Typo",word$,0,-1,,-1
ENDPROC
```

The procedure above will send the output of the typo command to the screen. However, SpellMaster also has the ability to buffer the output and/or send the output to a file.

'Spell_CheckWord'

This command does as it says, it checks the spelling of a word. The word may even include wildcards, for example:

```
*CHECK AD#I*
```

This would list all the words that start with "AD" and have an "I" as their fourth letter.

```
DEFPROCcheck_word(word$)
SYS "XSpell_CheckWord",word$ TO
                              ;flags
IF (flags AND %10)=0 THEN ERROR
                  1,"word not known"
ENDPROC
```

Unfortunately, the output of this command can only be displayed on the screen. However, you can send the output to a file by means of *SPOOLON.

'Spell_BrowseWindow'

A browse window is a window which contains an alphabetic list of words that SpellMaster recognises. The user can search through the window using the cursor keys or by beginning to type in the word. The highlighted word may then be selected by pressing <return> or the browse ended by pressing <escape>.

'Spell_BrowseWindow' gives you direct access to the SpellMaster browse window. It has quite a complicated set of entry conditions and if you get them wrong, the results are most bewildering. Basically, the command requires the format of the window and the starting word. Having got these, SpellMaster displays a browse window in the top left-hand corner of the current text window. (See PROCbrowse for an example of its use.)

It would be very easy to incorporate Spell-Master's facilities into your own programs, in order to obtain some very powerful utilities. Anyone who requires further information on SpellMaster SWIs can get a full list from Computer Concepts by sending them a large SAE. (See Factfile for the address.)

```
 10 REM >SpellEG
 20
 30 REM ****************************
 40 REM *Using SpellMaster in BASIC*
 50 REM *  written by Adrian Look  *
 60 REM *       7th July 1988      *
 70 REM ****************************
 80
 90 REPEAT
100   INPUT'"word>"word$
110   word$=FNcheck_word(word$)
120   PRINT"corrected word>";word$
130 UNTIL FALSE
140 END
150
160 DEFFNcheck_word(word$)
```

```
170 IF word$="" THEN =""
180 SYS "XSpell_CheckWord",word$ TO
                                ;flags
190 IF (flags AND %10)=0 THEN =word$
200 word$=FNcorrect_word(word$)
210 =word$
220
230 DEFFNcorrect_word(newword$)
240 PRINT"word not found!":VDU 7
250 REPEAT
260   PRINT"(A)bort"
270   PRINT"(B)rowse"
280   PRINT"(C)orrect"
290   PRINT"(S)uggest"
300   PRINT"Please select option>";
310   REPEAT
320     key$=GET$
330   UNTIL INSTR("AaBbCcSs",key$)
340   IF key$<"a" THEN key$=CHR$(ASC
                              (key$)+32)
350   PRINTkey$
360
370   CASE key$ OF
380     WHEN "b" : PROCbrowse
                              (newword$)
390     WHEN "c" : newword$=FNinput_
                        word(newword$)
400     WHEN "s" : PROCsuggest
                              (newword$)
410   ENDCASE
420 UNTIL key$<>"s" AND key$<>"b"
430 IF key$<>"a" THEN newword$=
                FNcheck_word(newword$)
440 =newword$
450
460 DEFPROCbrowse(start$)
470 indent=1:dwidth=20
480 wwidth=22:depth=10
490 infoword$=CHR$(indent)+CHR$
   (dwidth)+CHR$(wwidth)+CHR$(depth)
500 startinv$=CHR$(17)+CHR$(135)
                    +CHR$(17)+CHR$(0)
510 startinv$=CHR$(LEN(startinv$))
                              +startinv$
520 stopinv$=CHR$(17)+CHR$(128)+
                    CHR$(17)+CHR$(7)
530 stopinv$=CHR$(LEN(stopinv$))
                              +stopinv$
540 CLS
550 SYS "XSpell_BrowseWindow"
          ,start$,startinv$,stopinv$
                ,infoword$,31,0 TO x
560 PRINT"oldword>";start$
570 IF x<>-1 THEN PRINT"selected
          word>";:SYS "OS_Write0",x
                              :VDU 7,13,10
580 ENDPROC
590
600 DEFFNinput_word(oldword$)
610 PRINT"old word:";oldword$
620 INPUT"input>"newword$
630 =newword$
640
650 DEFPROCsuggest(word$)
660 PRINT"suggested words:"
670 SYS "XSpell_Typo",word$,0,-1,,-1
680 ENDPROC
```

(If someone wants a program to write using the SpellMaster facilities, how about a Crossword Helper? My idea would be a WIMP-operated program which allowed you to have a number of words on the screen at any one time each in a separate window and each with blanks for the unknown letters. You could point to any of the words and add or remove letters. SpellMaster would then list all the possible words that fitted, puting them into another window so that you could scroll up and down through the list. Once you had solved a clue, that word (or words) could be removed from the screen by clicking the close box and new ones could be added. Anyone fancy writing this for me? We would be happy to send you the SpellMaster SWI documentation plus a little fix that you may need.)

Crossword Help Program

Until such time as someone writes me a proper crossword-helper program, I will use the following program which allows me to use the *CHECK and *ANAGRAM commands without having to type them in each time. When it runs, it allows you to type in words to be checked. Then if you want to do an anagram, type <.><return> and you can enter the anagram after which it returns to checking.

```
10 REM > $.SpelMaster.Checker
20
30 MODE12 : COLOUR 0,4
40 ON ERROR PROCerror
50
60 REPEAT
70   INPUT"Check : "A$
80   IF A$="." THEN PROCanagram
                          ELSE PROCcheck
```

```
 90 UNTIL FALSE
100 END
110
120 DEFPROCcheck
130 PRINT:OSCLI("Check "+A$)
                          :PRINT
140 ENDPROC
150
160 DEFPROCanagram
170 INPUT'"Anagram : "A$
180 PRINT:OSCLI("Anagram "+A$)
                          :PRINT
190 ENDPROC
200
210 DEFPROCerror
220 IF ERR=17 THEN PRINT''
                  "Finished":END
230 PRINT REPORT$'
240 ENDPROC A
```

Leonardo – Mode 12 Art Package

Karl Strickland

Although true Archimedes software is still a bit thin on the ground, there are a number of art packages available ranging from Acorn's ARM Paint to Clares' Artisan. However, this latest package is designed for a different type of work – the manual says "It is based around the concept of a pixel editor, but with a number of powerful drawing functions". This suggests that it provides extensive pixel orientated facilities, and the basic drawing facilities – e.g. you won't find a distortion feature as in Artisan. So what **does** it provide and is it of any use?

The program will work on any Archimedes, although there is a slight loss of functionality on a 305, though this can be corrected by *UNPLUGing various unused modules – the manual tells you which modules you can safely disable.

When you boot the program, you are presented with a window in the bottom left hand corner of the MODE 12 (i.e. 16 colours) screen, containing the menu. For the program to load correctly, you must have *CONFIGUREd enough screensize and spritesize. From this menu, you can select which action you want to perform, set magnification factors, load and save screens (more of this later), choose your current foreground colour and alter the colours available using three sliders as in the desktop, which is much better than the method used by ARM Paint.

Drawing Facilities

The package provides similar facilities to ARM Paint, in this respect, and includes an Airbrush, Draw (equivalent to ARM Paint's Brush, although there is no facility for altering brush size), Flood fill and facilities for drawing rectangles, triangles, circles, ellipses and ovals (same as ellipse but major and minor axes are aligned with the X and Y axes). Each shape can be filled in when drawn, by selecting the solid option.

There is also a 'dither' option which effectively lets you 'mix' two colours together, the resulting colour is displayed just above the palette as the currently selected colour. This is a useful feature that lets you use more than 16 shades of colour at the cost of halving your colour resolution. This is not usually a problem however, as only on occasions will you need to have two differently coloured pixels together – one directly after the other. Advice on selecting colours is given in the manual.

There are, no move or copy features available which is a pity. However, when looking at the drawing facilities, bear in mind that we could easily use another package such as Artisan (or ARM Paint) to do the main drawing (if we need move or copy etc) and import the picture to Leonardo for pixel editing, which is where the package's strength really lies.

Magnification Facilities

In this area, the package really stands out. You can magnify any area of the picture by a factor of 2, 4, 8 or 16. Now, I know that most programs have a magnification or zoom facility, but how many allow you to use ALL the drawing options on the magnified area? The magnification scales available allow you to edit with ease, the most detailed part of your picture. The extensive magnification facilities have their roots in pixel based editors – hence the author's description of the package.

Undo Command

Something lacking from ARM Paint is an undo command. This is essential in any serious program, because accidents will happen, and it's annoying when your fill command leaks, and obliterates your masterpiece! Thankfully, that's available in Leonardo and is implemented more fully than in most programs. First of all, you can actually undo the undo facility, so if you realise that you shouldn't have undone something after all, you can 'undo' again and the picture will be restored to its former state. Usually, you can only do this (i.e. undo the undo feature) on a 1 Mbyte machine but the manual says that it is possible to do it on a 305 if you *UNPLUG some modules. Secondly, when you execute an undo command, the screen is restored to the state it was in before you selected the last command from the menu. However, if you are doing a lot of work with one particular command, it is possible to protect certain actions so that they would not be undone by the undo command. I've never seen this feature anywhere else.

Saving and Loading

Although the saving and loading of pictures may seem trivial, this package provides two commands – QSAVE and QLOAD. These save and load a picture in a compressed format (similar idea to Adrian Look's article in Archive 1.11) and are usually quicker than the normal *Screensave and *Screenload commands which are also available. By using these commands, Beard Technology have managed to put 15 demonstration pictures on the program disk and still have over 640,000 bytes free!

Execution of * commands

These can be executed in a window that pops up on the screen. This lets you *MOUNT disks etc. If the command is prefixed by =, the resulting output is not written back to the window, but rather directly onto the picture. The manual says that these can be of use when grabbing and manipulating images from the Watford Video Digitiser.

Conclusion

The manual is short and clear. The fact that it is so short, demonstrates how easy the program is to use. In fact, I was able to make effective use of the program within about an hour....and someone who can actually draw might do even better! However, there are of course a few complaints.

It's not possible to plot colours using GCOL's logical operations AND OR and NOT as in ARM Paint and most other packages. The sliders that you use to select the colour can't actually slide as they can in the desktop – i.e. you can't hold down a mouse button, move the mouse and see the change in colour. Finally, the manual says that it's possible to run the program by clicking on !BOOT from the desktop. But, unfortunately this doesn't work (not on my version anyway) as the !BOOT file is a *EXECable one and not a RUNable BASIC file, but this can easily be corrected of course.

As a drawing package, it generally performs better than ARM Paint, (with the exception of the logical operations, and the block move and copy) – the main advantages here are use of all the screen and the fast, compressed screen save/load. However, it is really meant to be used in areas where a normal pixel editor might once have been used – for example touching up pictures which have either been grabbed with a digitiser, or created with a program such as Artisan or indeed Leonardo. Its main advantage over conventional pixel editors (such as the Sprite Editor on the Welcome Disk) is its ability to use the normal drawing commands on the magnified image. As a pixel editor, therefore, I would recommend it – and you also get a pretty good drawing package as well. There is soon to be a new version of the program that will run in Mode 15 with the full 256 colours, known as Leonardo-256. The author says that "Leonardo-256 will contain almost all the features of Leonardo and will also have a font generator and a printer dump routine for Epson-compatible printers." The Mode 12 version costs £17.50 and the Mode15 version will probably cost £19.50, but will require a 1 Mbyte machine. A

Small Ad's

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WIMPs Explained – Icons

Adrian Look

As promised last month I shall now try to explain the use of icons in the WIMP system. Essentially, icons are to the wimp system what keys are to computers. That is they form the primary input interface from the user to the computer.

Icons appear everywhere in the Arthur Window Manager (AWM). They appear as window titles, pop-up menu items and I suppose that the scroll bars, quit boxes, etc are also icons of a sort. In fact it would seem that even a window's work area, to a certain extent, behaves like an icon as it also has a 'button type'.

Button Types

What is a button type? If the user presses a mouse button when the pointer is over an icon, the icon may respond by notifying the application via the AWM's Wimp_Poll routine. Each icon can react (or not) in different ways to different types of mouse click – this is what is referred to as the button type. Button types are denoted by a number which ranges from 0-15, and are listed below:

0 ignore mouse clicks
1 notify application whenever pointer is over the icon
2 a click notifies application (auto-repeat)
3 a click notifies application (debounced)
4 a click selects the icon and the release notifies application (or the icon is deselected if the pointer has moved away)
5 a click selects the icon, and a double click notifies application
6 as (3), but the icon can also return a drag action (returns button state * 16)
7 as (4), ditto
8 as (5), ditto
9 icon is selected when the pointer is over it, and the application is notified if the icon is clicked
10 a click returns button state * 256, a drag returns button state * 16, a double click returns button state * 1
11-14 reserved
15 the icon is writeable (mouse click causes caret, a vertical text cursor, to be positioned inside the icon – i.e. the icon can receive text input)

Definitions

There are several terms in the above list which need defining:

A **'click'** is when a mouse button is pressed.

A **'release'** is when the mouse button is released.

A **'drag'** is when the mouse button is held down – this can only be done with the select and adjust buttons.

The **'button state'** is a number that indicates which mouse buttons are held down:

bit 0 (1) – right-hand button (adjust)
bit 1 (2) – middle button (menu)
bit 2 (4) – left-hand button (select)

Thus if, as in button type 10, the select button is clicked, the icon will notify the application that button state 4 (* 256) has occurred.

A **'selected' icon** is an icon which is highlighted. This condition can be read by SYS "Wimp_GetIconState" (as explained below) so that the application program can act accordingly – for example the desktop uses selected icons (representing files) to tell it on which files it is to perform a particular function.

Icons that belong to the same **'exclusive selection group'** (or ESG for short), may not be selected at the same time. So if you select an icon in an ESG, any other icon that is already selected in the same ESG will be deselected (unless bit 10 in the icon definition is set and the adjust button is used – see below, or the user manually selects the icon via SYS "Wimp_SetIconState" – again see below). Note: there are 16 ESG ranging from 0-15.

'Wimp_CreateIcon' at &400C2

Now we are ready to create our icons! This is done by letting the AWM know where our icon is (in a particular window) and what it looks like. For this we use the SYS "Wimp_CreateIcon" routine, with the appropriate data block set-up as below:

block!0 : handle of window in which icon is to appear
block!4 : min x co-ordinate of bounding box
block!8 : min y co-ordinate of bounding box
block!12 : max x co-ordinate of bounding box
block!16 : max y co-ordinate of bounding box

(The bounding box defines the icon's limits – the co-ordinates are relative to the work area origin.)

block!20 : flags
bit 0 icon contain text
1 icon is a sprite
2 icon has a border
3 icon is horizontally centred in the bounding box
4 icon is vertically centred in the bounding box
5 icon has a filled background
6 text is anti-aliased
7 icon requires help from the application to be drawn
8 icon is indirected (see below)
9 icon it right justified within bounding box
10 if selected with the right-hand button other icons in the same ESG won't be canceled (deselected)
11 reserved – must be 0
12-15 button type (as explained above)
16-20 exclusive selection group
21 icon is selected
22 icon cannot be selected i.e. it is shaded
23 icon has been deleted
either (if icon not anti-aliased):
24-27 foreground colour
28-31 background colour
or (if icon text is anti-aliased):
24-32 font handle
block!24 : icon data (12 bytes)

The icon data consists of either text or a sprite name (terminated by an &0D). However, if the icon is indirected (i.e. bit 8 is set) then the 12 icon data bytes change their meaning. They will point to an address where the icon data is stored. This way more than 12 bytes can be used.

The location of the indirected icon data is probably known to the programmer (application) so that the icon data can be read or changed. Thus the 12 bytes are now used as shown below:

icondata!0 = indirected data block
icondata!4 = -1
icondata!8 = length of indirected data block

Once the data block has been set up (say, for example, at block%) then you should use SYS "Wimp_CreateIcon",,block% to cause the AWM create the icon. However, creating an icon does not cause it to be drawn on the screen. In order for this to happen you must invoke a SYS "Wimp_ ForceRedraw" for the bounding box of the icon (as described in issue 5, page 37).

'Wimp_Poll' condition 9 – mouse button click

Now that we have created our icon we need to be able to interpret the results that we will get when the user clicks on it. This is done via the Wimp_Poll condition number 9 (see issue 3 page 26 for information on the Wimp_Poll routine). This condition is returned when the mouse state changes – e.g. the mouse moves over an icon, out of a window, or a button is pressed/released, etc. All the information we need to know is returned in the Wimp_Poll data block as shown below:

block!0 = mouse x co-ordinate
block!4 = mouse y co-ordinate
block!8 = new state of mouse buttons
block!12 = window handle (or -1 if not in one)
block!16 = icon handle (or -1 if not over one)
block!20 = old state of mouse buttons

The button state is a number relating to the action being performed by the mouse buttons, but if the mouse is over an icon (or a window work area), then only conditions denoted by the icon's button type will be reported:

bit 0 : right-hand button pressed (adjust)
1 : middle button pressed (menu)
2 : left-hand button pressed (select)
4 : drag initiated with the adjust
6 : drag initiated with the select
8 : single click with adjust (if icon/work area button type = 10)
10 : single click with select (if ditto)

Once you have received condition number 9, you may allow the application program to act accordingly – for example, if the icon were a sprite of a disc (in an icon bar) then the application may cause a load/save menu to pop-up or ask for a filename.

An icon can return another Wimp_Poll condition, if it is writeable and holds the input focus. Condition number 8 – is returned when a key is pressed (as described in issue 6, page 30).

Described below are three routines which allow you to read or write (parts) of an icon's definition.

'Wimp_GetIconState' at &400CE

This routine allows you to read all the information relating to a specific icon. The information is returned to you in a data block (which you designate) in the same format as Wimp_CreateIcon – e.g:

```
DIM block% 32
:
DEFPROCget_icon_info(window_handle%
                     ,icon_handle%)
block%!0=window_handle%
block%!4=icon_handle%
SYS "Wimp_GetIconState",,block%
ibx0%=block%!8
iby0%=block%!12
ibx1%=block%!16
iby1%=block%!20
iflags%=block%!24
IF (iflags% AND &100)>0 THEN
idata$=$block%!28:REM indirected
ELSE
idata$=$(block%+28):REM not
                          indirected
ENDIF
ENDPROC
```

'Wimp_SetIconState' at &400CD

All this call does is to allow you to change the icons flags but it does redraw any relevant changes automatically. If you wish to change the bounding box or the 12 icon data bytes, you must delete the icon and recreate it. However, the icon will then have to be redrawn using SYS "Wimp_ForceRedraw" in order to display the changes. The Wimp_SetIconState routine employs a mask and EOR mechanism for altering the icons flags. Thus:

<new state> = (<old state> BIC <mask word>)
EOR <EOR word>

All this means, is that the bits that are set in the <mask word> are cleared in the <icon flags> and the resulting word is the EORed with the <EOR word>. If you don't know what an EOR operation is then you should look it up in the User Guide (page 258). for example:

<icon flags>	: %1010 1100
<mask word>	: %1111 0000
<result>	: %0000 1100
<EOR word>	: %0110 0101
<new icon flags>	: %0110 1001

So if you wish to change bits 12-15 of the icon data (button type) without altering the rest of the flags, you should set those bits in the <mask word> and put the new button type in bits 12-15 of the <EOR word>. So once you have called the Wimp_Set IconState routine, the button type will be updated.

```
DIM block% 16
:
DEFPROCset_icon_state(window_handle%
       ,icon_handle%,mask%,eor%)
block%!0=window_handle%
block%!4=icon_handle%
block%!8=eor%
block%!12=mask%
SYS "Wimp_SetIconState",,block%
ENDPROC
```

'Wimp_WhichIcon' at &400D6

This routine allows you to ask the AWM which icons (in a particular window) have a particular bit setting, for example which icons are selected. The AWM will then return a list of icons (terminated by a -1). This is done, again, via a bit mask but only the bits in the bit mask are checked. For example:

icon data	: %1000 1011 or	%1001 0101
mask	: %0000 0011	%0000 0011
result	: %0000 0011	%0000 0001
check for	: %0000 0011	%0000 0011
resultant	: add to list	ignore

```
DIM block% &100
:
DEFPROCwhich_icon(window_handle%
          ,mask,desiredsetting%)
LOCAL icon_handle%,pos%
SYS "Wimp_WhichIcon",
    window_handle%,block%,mask%,
                  desiredsetting%
pos%=0
REPEAT
icon_handle%=block%!pos%
pos%+=4
:
REM perform desired action
:
UNTIL block%!pos%=-1
ENDPROC
```

'Wimp_DeleteIcon' at &400C4

Finally, having finished with our icon we may wish to delete it. For this we use the Wimp_DeleteIcon routine and, as with the Wimp_CreateIcon, we need a Wimp_ForceRedraw in order for the screen to be updated, once the icon has been deleted. So it is important to read the icon's bounding box (using Wimp_GetIconState) before deleting it.

```
DIM block% 32
:
DEFPROCdelete_icon(window_handle%
                   ,icon_handle%)
PROCget_icon_state(window_handle%
                   ,icon_handle%)
SYS "Wimp_DeleteIcon",,block%
SYS "Wimp_ForceRedraw",window_
  handle%,ibx0%,iby0%,ibx1%,iby1%
ENDPROC
```

The program listing below implements the idea of an icon bar. This is a window which is outside the system area (but still visible on the screen). The region used is (0,0) to (1279,100).

Next month I will be looking at drag-boxes. So until then, happy WIMPing and feel free to send in any questions, if you have problems.

```
 10 REM >$.Wimp.IconProg
 20
 30 REM ************************
 40 REM *      Using Icons      *
 50 REM *   in the WIMP System  *
 60 REM *   Adrian Philip Look  *
 70 REM ************************
 80
 90 MODE 12:OFF
100 ON ERROR PROCsys_reporterror
110 PROCsys_variables
120 PROCsys_startup
130
140 PROCprogram_initialise
150
160 ON ERROR PROCsys_reporterror
170 SYS "Wimp_ForceRedraw",-1,0,0,
                          1280,1024
180 quit%=FALSE
190 REPEAT
200   SYS "Wimp_Poll",mask%,block%
                        TO reason%
210   CASE reason% OF
220     WHEN 2 :PROCwimp_openwindow
                          (block%)
230     WHEN 3 :PROCwimp_closewindow
                          (!block%)
240            PROCwimp_deletewindow
                          (!block%)
250     WHEN 6 : PROCprogram_
              processbuttons(block%)
           : REM process mouse clicks
260   ENDCASE
270 UNTIL quit%
280 END
290
300 DEFPROCsys_reporterror
310 PROCwimp_closedown
320 MODE 0
330 PRINT REPORT$;" at line ";ERL
340 END
350
360 DEFPROCsys_startup
370 OSCLI("Close")
380 SYS "OS_CLI","Print $.Wimp.
                          !WimpFont"
390 SYS "OS_CLI","Print $.Wimp.
                          !Palette"
400 version%=FNwimp_initialise
410 GCOL 0,143:CLG
420 ENDPROC
430
440 DEFPROCsys_variables
450 DIM block% &2000
460 DIM indirect% &2000
470 DIM icondata% 11
480 spritectrblock%=0
490 ipointer%=indirect%
500 mask%=0
510 bodgeit%=FALSE
520 ENDPROC
530
540 DEFPROCsys_quit
550 quit%=TRUE
560 PROCwimp_closedown
570 MODE 0
580 ENDPROC
590
600 DEFPROCsys_windowcolours(tfg%,
      tbg%,wfg%,wbg%,so%,sin%,hi%)
610 windowtitlefg%=tfg%
620 windowtitlebg%=tbg%
630 windowworkfg%=wfg%
640 windowworkbg%=wbg%
650 scrollout%=so%
```

```
660 scrollin%=sin%
670 highlight%=hi%
680 ENDPROC
690
700 DEFPROCsys_windowextent(sx%,sy%
                    ,sizex%,sizey%)
710 scrx%=sx%
720 scry%=sy%
730 wx0%=0
740 wy0%=-sizey%
750 wx1%=sizex%
760 wy1%=0
770 ENDPROC
780
790 DEFFNsys_windowflags(tb,mv,vts,
      hts,wmr,pan,oma,boq,sra,srd)
800 LOCAL flags%
810 flags%=0
820 IF -tb THEN flags%=flags% OR
                    &01:REM title bar
830 IF -mv THEN flags%=flags% OR
                     &02:REM movable
840 IF -vts THEN flags%=flags% OR
      &04 : REM vertical scroll bar
850 IF -hts THEN flags%=flags% OR
      &08:REM horizontal scroll bar
860 IF -wmr THEN flags%=flags% OR
      &10:REM can be redrawn by AWM
870 IF -pan THEN flags%=flags% OR
           &20:REM window is a pane
880 IF -oma THEN flags%=flags% OR
              &40:REM window can go
                    outside main area
890 IF NOT -boq THEN flags%=flags%
       OR &80:REM back and quit box
900 IF -sra THEN flags%=flags% OR
&100:REM scroll-rqst returned (auto-
                              repeat)
910 IF -srd THEN flags%=flags% OR
      &200:REM scroll-rqst returned
                         (debounced)
920 =flags%
930
940 DEFFNsys_createwindow(x0%,y0%,
            x1%,y1%,pos%,iconflags%
                    ,wflags%,bt%)
950 LOCAL x,handle%
960 block%+=4
970 block%!0=x0% : REM window
                      screen position
980 block%!4=y0%
990 block%!8=x1%
1000 block%!12=y1%
1010 block%!16=scrx% : REM scroll
                        bar position
1020 block%!20=scry%
1030 block%!24=pos% : REM window
                      stack position
1040 block%!28=wflags% : REM window
                             flags
1050 block%?32=windowtitlefg% : REM
                           colours
1060 block%?33=windowtitlebg%
1070 block%?34=windowworkfg%
1080 block%?35=windowworkbg%
1090 block%?36=scrollout%
1100 block%?37=scrollin%
1110 block%?38=highlight%
1120 block%?39=0 : REM reserved
1130 block%!40=wx0% : REM work area
                          definition
1140 block%!44=wy0%
1150 block%!48=wx1%
1160 block%!52=wy1%
1170 block%!56=iconflags% :REM title
                      bar icon flags
1180 block%!60=bt% : REM work area
button type
1190 block%!64=spritectrblock% : REM
       sprite control block pointer
1200 block%!68=0 : REM reserved
1210 FOR x=0 TO 11:!(block%+72+x)=
                 icondata%!x:NEXT x
              : REM title icon data
1220 block%!84=0 : REM no of icons
1230 handle%=FNwimp_createwindow
                              (block%)
1240 block%-=4:block%!0=handle%
1250 =handle%
1260
1270 DEFPROCsys_openwindow(handle%)
1280 !block%=handle%
1290 SYS "Wimp_GetWindowState",,
                                block%
1300 block%!28=-1
1310 PROCwimp_openwindow(block%)
1320 ENDPROC
1330
1340 DEFFNsys_iconflags(t,s,b,h,v,f,
       aa,hp,i,r,ne,bt,esg,inv,sha
                    ,del,fg,bg,fn)
1350 LOCAL flags%
1360 flags%=0
1370 IF -t THEN flags%=flags% OR &1
                          : REM text
```

```
1380 IF -s THEN flags%=flags% OR &2
                          : REM sprite
1390 IF -b THEN flags%=flags% OR &4
                          : REM border
1400 IF -h THEN flags%=flags% OR &8
              : REM horizontal center
1410 IF -v THEN flags%=flags% OR &10
                : REM vertical center
1420 IF -f THEN flags%=flags% OR &20
              : REM filled background
1430 IF -aa THEN flags%=flags% OR
       &40:REM text is anti-aliased
1440 IF -hp THEN flags%=flags% OR
           &80:REM icon need help to
                              be redrawn
1450 IF -i THEN flags%=flags% OR
       &100 : REM icon is indirected
1460 IF -r THEN flags%=flags% OR
             &200 : REM text is right
                              justified
1470 IF -ne THEN flags%=flags% OR
       &400 : REM don't cancel other
                              icons in esg
1480 flags%=flags% OR bt<<12 : REM
                             button type
1490 flags%=flags% OR esg<<16 : REM
           exclusive selection group
1500 IF -inv THEN flags%=flags% OR
         &200000 : REM icon inverted
1510 IF -sha THEN flags%=flags% OR
           &400000 : REM icon shaded
1520 IF -del THEN flags%=flags% OR
          &800000 : REM icon deleted
1530 IF -aa THEN
1540   flags%=flags% OR fn<<24 : REM
            anti-aliased font number
1550   ELSE
1560   flags%=flags% OR fg<<24 : REM
                    foreground colour
1570   flags%=flags% OR bg<<28 : REM
                    background colour
1580 ENDIF
1590 =flags%
1600
1610 DEFPROCsys_icondata(string$
                         ,indirected%)
1620 LOCAL pos%
1630 CASE indirected% OF
1640   WHEN 0 : $icondata%=string$
1650   WHEN 1 : pos%=INSTR(string$,
                                  "(")
1660            icondata%!0=EVAL
              (LEFT$(string$,pos%-1))
1670            icondata%!4=-1
1680            icondata%!8=EVAL
                (RIGHT$(string$,LEN
                   (string$)-pos%))
1690 ENDCASE
1700 ENDPROC
1710
1720 DEFFNsys_createicon(handle%,x0%
           ,y0%,x1%,y1%,iconflags%)
1730 LOCAL x%,ihandle%
1740 block%!0=handle%
1750 block%!4=x0%
1760 block%!8=y0%
1770 block%!12=x1%
1780 block%!16=y1%
1790 block%!20=iconflags%
1800 FOR x%=0 TO 11:!(block%+24+x%)=
                icondata%!x%:NEXT x%
1810 ihandle%=FNwimp_createicon
                                (block%)
1820 =ihandle%
1830
1840 DEFFNwimp_initialise
1850 LOCAL version%,x%
1860 SYS "Wimp_Initialise" TO
                                 version%
1870 bodgeit%=(version%<18)
1880 IF bodgeit% THEN
1890   DIM oldfx%(9)
1900   FOR x%=0 TO 8:SYS "OS_Byte",
            x%+220,2,0 TO ,oldfx%(x)
                                 :NEXT x%
1910   SYS "OS_Bytes",219,2,0 TO
                               ,oldfx%(9)
1920 ENDIF
1930 =version%
1940
1950 DEFFNwimp_createwindow(block%)
1960 LOCAL handle%
1970 SYS "Wimp_CreateWindow",,block%
                             TO handle%
1980 =handle%
1990
2000 DEFFNwimp_createicon(block%)
2010 LOCAL ihandle%
2020 SYS "Wimp_CreateIcon",,block%
                           TO ihandle%
2030 =ihandle%
2040
2050 DEFPROCwimp_deletewindow
                                (handle%)
2060 !block%=handle%
```

```
2070 SYS "Wimp_DeleteWindow",,block%
2080 ENDPROC
2090
2100 DEFPROCwimp_deleteicon(whandle%
                          ,ihandle%)
2110 block%!0=whandle%
2120 block%!4=ihandle%
2130 SYS "Wimp_DeleteIcon",,block%
2140 ENDPROC
2150
2160 DEFPROCwimp_openwindow(block%)
2170 SYS "Wimp_OpenWindow",,block%
2180 ENDPROC
2190
2200 DEFPROCwimp_closewindow
                          (handle%)
2210 !block%=handle%
2220 SYS "Wimp_CloseWindow",,block%
2230 ENDPROC
2240
2250 DEFPROCwimp_closedown
2260 LOCAL x%
2270 IF bodgeit% THEN
2280   FOR x%=0 TO 8:SYS "OS_Byte",
         x%+220,oldfx%(x%),0 NEXT x%
2290   SYS "OS_Bytes",219,oldfx%(9),0
2300   ELSE
2310   SYS "Wimp_CloseDown"
2320 ENDIF
2330 ENDPROC
2340
2350 My Program (rather than the
                WIMP implementation)
2360 ------------------------------
2370
2380 DEFPROCprogram_initialise
2390 OSCLI("SLoad $.Wimp.!Sprites")
2400 wx=500:wy=500
2410 left=16:right=1260
2420 PROCprogram_createwindows
2430 ENDPROC
2440
2450 DEFPROCprogram_createwindows
2460 PROCsys_windowcolours(14,13,7,
                           0,4,13,11)
2470 PROCsys_windowextent(0,0,1275
                               ,96)
2480 wflags%=FNsys_windowflags(0,0,
                     0,0,1,0,1,0,0,0)
2490 iconflags%=0:PROCsys_icondata
                               ("",0)
2500 ibar%=FNsys_createwindow(4,4,
   1279,100,-1,iconflags%,wflags%,0)
2510 i_quit%=FNprogram_addtoiconbar
                          ("quit",-1)
2520 i_fdisc%=FNprogram_addtoiconbar
                          ("fdisc",-1)
2530 i_window%=FNprogram_
       addtoiconbar("newwindow",0)
2540 i_palette%=FNprogram
         _addtoiconbar("palette",0)
2550 i_time%=FNprogram_addtoiconbar
                          ("time",0)
2560 PROCsys_openwindow(ibar%)
2570 ENDPROC
2580
2590 DEFPROCprogram_createwindow
                               (name$)
2600 LOCAL bc
2610 CASE name$ OF
2620   WHEN "<untitled>"  : bc=13
2630   WHEN "palette"     : bc=8
2640   WHEN "time"        : bc=10
2650   WHEN "floppy disc" : bc=12
2660 ENDCASE
2670 PROCsys_windowcolours(14,bc,7,0
                           ,4,bc,11)
2680 PROCsys_windowextent(0,0,1279
                               ,1023)
2690 wflags%=FNsys_windowflags(1,1,1
                     ,1,1,0,0,1,0,0)
2700 iconflags%=FNsys_iconflags(1,0,
          0,1,1,0,0,0,0,0,0,0,0,0
                     ,0,0,0,0,0)
2710 PROCsys_icondata(name$,0)
2720 void%=FNsys_createwindow(wx,wy,
       wx+272,wy+272,-1,iconflags%
                     ,wflags%,0)
2730 PROCwimp_openwindow(block%)
2740 wx+=50:wy-=50
2750 IF wx>900 OR wy<150 THEN
                          wx=0:wy=700
2760 ENDPROC
2770
2780 DEFFNprogram_addtoiconbar
                          (name$,pos)
2790 LOCAL w,h
2800 SYS "OS_SpriteOp",40,0,name$ TO
                               ,,,w
2810 w=w*2+32
2820 iconflags%=FNsys_iconflags(0,1,
          0,1,1,0,0,0,0,0,0,1,0,0
                     ,0,0,0,0,0)
2830 PROCsys_icondata(name$,0)
2840 IF pos THEN
```

Assembly Language Programming – 3

Alan Glover

Before getting into this month's examples, type in and save this BASIC program. It will provide a shell into which assembly language statements can be put for testing.

```
   0 REM >Shell
  10 DIM Code 1024
  20 FOR option=0 TO 3 STEP 3
  30 P%=Code
  40 [OPT option
1000 MOV R15,R14
1010 ]
1020 NEXT
1030 CALL Code
```

Begin adding instructions at line 50 and be careful not to go beyond line 1000. By using the BASIC Editor, the latter consideration will not apply, since the program will be automatically renumbered when it becomes necessary.

The MOV R15,R14 is a safety measure for programs which by accident or design do not finish properly and would otherwise wander off into oblivion and an eventual Address Exception error.

The main change between this and the earlier program is that the code is actually assembled twice by the FOR/NEXT loop. On the first pass, with option at 0, no listing or error reports are produced, but on the second pass, with option at 3, a listing is generated and errors are reported.

The rest of this month's part consists of some small programs to insert within the shell, each introducing some new ideas.

Load Immediate

```
50 MOV R0,#45
60 SWI "OS_WriteC"
```

These two lines write character 45 on the screen. Line 50 loads R0 with the value 45. A load such as this where the actual number to use is quoted instead of an address to get data from is called 'immediate', meaning that the ARM has not got to get the value from another location.

SWI "OS_WriteC" was introduced last month. It writes the character in R0 to the screen.

The MOV R15,R14 terminates the program by restoring the address to which the processor should return (in R14 which is called, in this context, the 'Link Register') to the program counter in R15.

In fact these two can be combined into one instruction using "OS_WriteI" which has also been mentioned, but I wanted to make the point about immediate data!

```
2850    ihandle%=FNsys_createicon
            (ibar%,left,-96,left+w,0,
                          iconflags%)
2860    left+=w
2870    ELSE
2880    ihandle%=FNsys_createicon
            (ibar%,right-w,-96,right,
                       0,iconflags%)
2890    right-=w
2900 ENDIF
2910 =ihandle%
2920
2930 DEFPROCprogram_processbuttons
                              (block%)
2940 button_state%=block%!8
2950 whandle%=block%!12
2960 ihandle%=block%!16
2970 IF button_state%=4 THEN
2980    CASE whandle% OF
2990    WHEN ibar%
3000      CASE ihandle% OF
3010        WHEN i_quit% : PROCsys
                                  _quit
3020        WHEN i_window%:PROCprogram
          _createwindow("<untitled>")
3030        WHEN i_palette% :
              PROCprogram_createwindow
                          ("palette")
3040        WHEN i_time%: PROCprogram
                _createwindow("time")
3050        WHEN i_fdisc%:PROCprogram
                          _createwindow
                      ("floppy disc")
3060      ENDCASE
3070    ENDCASE
3080 ENDIF
3090 ENDPROC A
```

Moving data between registers

This one is slightly longer, and expands the concept by showing values moving between registers :

```
 50 MOV R2,#ASC("M")
 60 MOV R1,#ASC("R")
 70 MOV R0,#65
 80 SWI "OS_WriteC"
 90 MOV R0,R1
100 SWI "OS_WriteC"
110 MOV R0,R2
120 SWI "OS_WriteC"
```

Note again the use of immediate data, shown by the use of #, and that the expression evaluation facilities of BASIC are available – so rather than look up the ASCII code for "M" you can use ASC("M") with the correct effect.

The instructions in lines 90 and 110 are a different type of MOV instruction. They still cause the content of R0 to be altered, but this time it is given the value of R1 in line 90, and R2 in line 120. R1 and R2 are unaffected by this move, i.e. you are copying the contents of R1 into R0 and R2 into R0

We now return to the theme of conditional execution with this example:

```
 50 ADR R0,text
 60 SWI "OS_Write0"
 70 MOV R0,#30
 80 CMP R0,#ASC("A")
 90 MOVEQ R0,#ASC("=")
100 MOVHI R0,#ASC(">")
110 MOVLO R0,#ASC("<")
120 SWI "OS_WriteC"
130 SWI "OS_NewLine"
140 MOV R15,R14
150 .text EQUS "Result : "
160 EQUB 0
```

This program displays <, =, or > depending whether the value used in line 70 is less than, equal to, or greater than the one in line 80.

Relative addresses

The ADR statement in line 50 is not strictly an ARM assembly language instruction. It has the function of loading R0 with the address of a location called 'text' in a manner which is relative. A relative address is where you would say, for example, that 'text' is 60 bytes in front of the current location rather than 'text' is at &8000. The former case allows code be assembled for one value of P% and work at other values.

ADR is provided by the assembler, and is evaluated to an instruction from the ARM repertoire which performs the desired effect.

Labels

The '.text' in line 150 is used to mark an address for use by the ADR in line 50. This is called a label, and has a number of other uses which will unfold in time. Labels are the reason why code is assembled twice – on the first time through the assembler notes where the labels are and, on the second pass, it puts their values into the instructions which use them.

The CMP in line 80 compares the value in R0 with the immediate value after it. The flags are automatically set after this instruction, allowing conditional execution upon the result.

Lines 90-110 are all conditional, shown by the extra two characters after the MOV instruction. HI stands for HIgher than, EQ for EQual, and LO for LOwer than. Only one of these will actually execute, though all will be fetched into the ARM.

All instructions can be made conditional, so an alternative way of doing lines 90-120 would be :

```
 90 SWIEQ WriteI+ASC("=")
100 SWIHI WriteI+ASC(">")
110 SWILO WriteI+ASC("<")
```

In fact, every instruction normally has a conditional field of 'AL' for Always execute, but the assembler assumes it unless a different one is entered.

Experiment with other values in lines 70 and 80. You may find some values that the assembler will reject. This is because it is impossible to store a 32 bit immediate value inside a 32 bit command and have any space left. Instead the ARM uses 12 bits, 8 for the value, and 4 for the number of pairs of bits to rotate it by. Consequently, immediate values requiring more than eight bits, e.g. &101 are impossible, and must be loaded in two stages or by other means. There is no need to be concerned with the method by which the shifting is determined because the assembler performs the encoding itself.

Now test yourself

To finish this month type in this program and see if you can work out what it does.

AlphaBlockers – Educational(?) Quiz Game

Julian Rockey

Games for the Archimedes are beginning to appear now but this offering from Software Services makes a very pleasant change from arcade games. It is based upon the TV series 'Blockbusters'. The board consists of a grid of hexagons, each containing a letter. One player has to make a line left to right, the other from top to bottom, by selecting letters and answering one of 2700 questions: the answer begins with the letter selected. Before playing, you must choose the category of questions you want to answer from General, Pop, Geography and Sport. The board is drawn and the game commences. The first letter is selected by the computer and the question asked. Players then have to press their key if they know the answer. The player that answers the question correctly chooses the next letter, and so on.

An editor is also supplied which allows you to create your own categories and questions. This gives the program excellent potential for education – teachers can set questions relevant to topics being studied and children can learn and have fun at the same time. Children love to do something "like on the telly".

The overall presentation is good: it is colourful and user-friendly. However, the flashing cursor looks messy sometimes and in some areas the program will not accept small letters – CAPS LOCK has to be on. This is unforgivable! At £15, it is quite good value considering the number of questions supplied with it. A

(We've spoken to Software Services who say they are going to correct both the problems mentioned and they will give us a reasonable discount so that we can pass it on to Archive subscribers at more than the usual 7.5% Archive discount. We can sell it for £13 inclusive. Ed.

```
 50 MOV R0,#25 \ <- Change this
      value and see what happens
 60 CMP R0,#30
 70 CMPNE R0,#40
 80 CMPNE R0,#50
 90 ADREQ R0,msg1
100 ADRNE R0,msg2
110 SWI "OS_Write0"
120 SWI "OS_NewLine"
130 MOV R15,R14
140 .msg1 EQUS "Good value"
150 EQUB 0
160 .msg2 EQUS "Bad Value"
170 EQUB 0
```

Answer on page 43. A

Educational Datafile Review

Mike Harrison

This is the age of information retrieval we tell the children, yet of all the applications to which education users put their computers, the handling of data is probably the least used. Even those of us who have bought the impressive Minerva System Delta Plus which will hold 2.14 billion records, 16 million fields with unlimited record size, are perhaps a little unsure of what to do with it. After all, to be really useful, a datafile should contain a lot of information for which you have no immediate use. How many of us have that much time to spend typing? Even if we did, the value of data retrieval is the discovery of facts about some items which you don't even know existed.

The field is therefore open for commercially produced datafiles and one such has been produced by Nick Evans. He describes this as a database of educational software and a database of addresses for users of computers in all spheres of education. If any Archive reader is seeking to test out a system with simultaneous sorting, searching and ordering of two large multi-field datafiles then these would set them off to a fine start. The software catalogue has over 3500 entries and the list of addresses of producers/suppliers has almost 1000 entries.

Nick's files which are updated every six months, will possibly be familiar to BBC owners with Viewstore or Key which, amongst others, have been the main formats for the hundreds sold to

LEAs over the past two years. The System Delta Plus version now offered to Archimedes owners is written on two discs. The software file categorises educational programs by their target age range and any of 30 subject areas as well as listing the suppliers and prices. The file can of course be sorted by any or all of these criteria and subsets created of primary software, databases or astronomy, for example. Before you ask, nothing conforms to all of these simultaneously, I've looked. Packages for the Archimedes are being incorporated into the file as they are being developed.

Potentially even more useful is the datafile of addresses. Of the nearly 3000 in this file they are categorised by product, for example specialists in packaging, research, interactive video, monitors, exhibitions, security and satellite communications can all be identified. In all, there are 50 categories, many companies listing more than one of these. Sorting by geographical area is also possible, which is the way I discovered that 3 of my local software suppliers all operate from the same address. (I wonder if the taxman knows? – He'll probably be the next to buy this package!)

The information sheet for the Archimedes version had not yet been produced at the time of testing for Archive. Owners familiar with System Delta Plus should have no difficulty in using the datafile in general but might like to know that the label format supplied by Minerva will not work with the fields in this file.The solution is to create your own format and link it to the datafile before calling up the label printing facility. The fields with the string lengths needed are :

NAME (50)

ADDR (48)

TOWN (20)

CODE (10)

Although no suggestion is made as to the quality of the products listed I feel this will prove to be an invaluable guide as to just what is available.

The Educational Computer User's Help Package is available for £20 (or £15 for the Viewstore version) from Nick Evans, 58 Weelsby Road, Grimsby, DN32 0PR. (0472–77215) A

Desktop Enhancer Review

Adrian Look

Mitre Software have brought out a package to extend the facilities of the desktop. The Desktop Enhancer (£29.95 inc. VAT) considerably extends the file handling features of the Desktop. It is able to do this because the package includes a module which allows system commands to be executed that would normally cause the Archimedes to 'bomb out' into the operating system.

Unlike other desktop extensions that have previously been produced for the Archimedes, this one uses a clever module to allow the desktop to remain in control after an application has been run (whether the application performs a *DESKTOP at the end or not). Now you can use the Desktop as a consistent working environment(?)

So what do you get? Well, you get a glossy laser printed 40 page manual and a disk. The manual is well written, for those who just wish to use the extra desktop facilities provided, although it is a bit difficult to navigate. However, the technical explanations are brief and consequently not much help – I suppose we shouldn't expect them to tell us all their secrets.

The first few things you will notice when you boot the disk up is that the palette, mouse speed, and icons, have been changed. I'm not sure I agree with the default settings, but the user can very quickly adapt the desktop to his/her own preference and save this default on the disk. The general implementation of the new extensions is very good. For example, the file windows now have full directory pathnames – so you know exactly where they come from; when you return to the desktop (from a program) the enhancer will set up the desktop exactly as you left it; when returning to the desktop, after an application has run, the user can select a pause so that the results at the end of the application can be seen before returning to the desktop. It is little things like this that really make the difference.

What extra facilities do you get? There are a whole host of disk functions which are file, directory and disk specific. The file specific extensions consist of:

Buffer Podule Review

Paul Beverley

SGB Computer Services have produced a buffer podule (£49.95 inclusive) which is basically a normal sized podule containing 5 buffer chips to allow the podule bus to be extended down a 0.5 metre length of cable to a socket into which you can connect another podule! What's the point of that? Well, firstly, if you have a number of podules you want to use at different times, you can easily plug and un-plug them from the end of the cable whilst keeping the lid on the computer. Also, if you are developing a podule interface yourself, it is a great advantage to have the podule on the bench in front of you rather than inside the computer.

The Hardware

The board seems to be well made on a screen-printed p.c.b. with plated-through holes and solder resist masking. The only criticism on the construction is that it has been hand soldered, not flow soldered, and the excess flux had not been cleaned off – a minor point perhaps since I suppose that modern fluxes should not cause long-term damage to the board, but "old habits...etc". One other minor technical hiccup (not SGB's fault) was that the board was slightly too long to be flush with the rear panel of the computer. This, I understand from other podule producers, is because Acorn made the box just slightly shorter than the standard Eurocard size!! This will be corrected on later Archimedes and in any case, 2.5mm washers are provided. The final hardware gripe is the way the cable has to squeeze out between the podule back panel and the box – not too elegant an arrangement but, to be fair, I couldn't think of a better solution.

Documentation

The manual is short and quite well produced. Although there is not really a lot to explain, what it does say is quite clear.

In use

Podule interfacing is not a trivial matter and the buffer podule is only meant to work with "Simple podules" and "External podules" so this excludes the I/O Podule which is really a MEMC podule and it didn't seem to work on the Watford digitiser either. The only thing I could try it out on was the Computer Concepts ROM podule. This didn't seem to work at first either as it came up with an address exception when trying to boot up after switch-on. However, after moving ROM podules and the buffer podule around into different combinations of using the upper and lower podule slot and using my fully populated board and a board with just a single ROM chip it seemed there was just **one** combination that did not work while all the other combinations **did** work. SGB could offer no definite explanation but suggested it might be stray signal pick-up from the 0.5m cable. (The first buffer podule they sent had a 1.0 metre cable as advertised in the July issue, but this would not work at all on my computer with the CC ROM podule although it had worked on SGB's computer prior to despatch.)

Where next?

Part of the idea of the buffer podule is that, in due course, you will be able to attach it to an external expansion box which will hold a number of different podules (5 single or 3 double). The 1.2 operating system can only cope with 4 podules, so the extra podule will have to be switched in and out, but Arthur 2.0 should be able to cope with more, so they could all be active at the same time. A

print, time stamp, access, set type, find; the directory specific extensions allow you to: set the current, user and library directories, produce a directory tree (and you can then delete/copy directories from this tree). Finally, the disk specific extensions allow you to: backup, name disc, verify, compact and show the free space map.

The remaining extensions include a star command facility and a few commands to allow you to 'link' your own desktop accessories into the Desktop Enhancer environment.

In conclusion, the Desktop Enhancer has been very well implemented, although I do wonder why they chose to extend the facilities of the present desktop rather than creating a new environment. If you like working from a desktop environment, this package certainly goes one step further than the present desktop and so it receives my recommendation (with a small reservation about the price). A

ArcImEd – Art package with a difference

Karl Strickland

This is a graphics package with a difference. You can draw your diagrams using the mouse, as usual, but when you've finished, this program will turn your diagram into a BBC BASIC program or procedure! The drawing can be as simple or as complex as you like – it doesn't matter. The package is more suited to formal drawings/diagrams rather than pictures. By using this program you can very quickly create drawings which you can use to illustrate your programs.

Documentation

The program disk comes with three pages of dot-matrix printed notes and a keystrip. The keystrip is taller than most, so that you can put it behind your current keystrip – probably that used with the BASIC Editor. Although this may be a good idea, I did find that it obstructed the disk drive if I had the keystrip holder at any usable angle – but then again, I have the keyboard quite close to the computer. The notes explain to 305 users how to configure their machine. They also explain how to make a backup copy of the disk, how to load the program and how to use the manual which is on disk. It may seem a strange idea to put the manual on disk, but it is usually done this way on Public Domain software and the way that the manual has been implemented here makes it an excellent feature and I think it is far superior to any printed manual – especially for a program of this type.

When using the main program, pressing the <ctrl> key brings up the manual, complete with colour graphics. You can then click the mouse pointer on NEXT or LAST to go to the next or last page. You can also click on INDEX which gives you an index, complete with page numbers. Clicking on one of these page numbers opens the manual at that page. In a program like this, where from time to time, you might want to look something up, having the manual 'on-line' (as it is in Unix) saves time, because you don't have to dig out the manual...and the one you want is always at the bottom of the pile – well, one of the piles!

Facilities available

When the program runs, it presents you with a window containing six icons, representing operations, information, colours, disk and commands. The program actually works by remembering and processing a series of 'points' or co-ordinate positions entered by using the mouse and clicking the buttons. Generally, clicking <adjust> corresponds to a BASIC MOVE, and <select> causes the operation to be completed – such as the drawing of a circle or maybe a rectangle. The points are stored in the sequence that you enter them, like the commands in a BASIC program. It is possible to move to any previously entered point, then to another and then delete the operations entered between those two points. This way it is possible to edit the diagram. It sounds complicated, but in practice it's very simple – it's just hard to explain to someone who's never seen it!

Operations

To use the operations icon, first of all, you select local for part of a screen or global for the whole screen. You then select the operation and, if you selected local, you also select which part of the screen you want to operate on – all using the mouse. The operations you can perform are translations (rotations where you select the angle of rotation interactively using the mouse), reflections (in both the X and Y axes) and scaling. These operations are performed on the actual points, not the graphical image, so the result may not always be what you expect. Also from this icon, you can select a grid. This grid is displayed on the screen (but is not stored with it – it is only displayed for reference purposes) so that you can line things up. The spacing of the grid in both X and Y directions is very flexible.

Information

This icon displays information about the program currently in memory – the collection of points together with their associated operations (MOVE, DRAW etc) are referred to as programs. The operation associated with the current point is marked with an asterisk and operations either side of this are also displayed.

Colours

The colours window allows you to select the foreground and background colours and even the colour of the border. There are usually 16 colours as the program operates in MODE 12 by default, although it will work in MODE 15 to give you 256 colours and the on-line manual gives you details on how to do it. Of course, each of the colours can also be redefined to any shade, using a method very similar to that used in Acorn's Sprite Editor on the Welcome Disk, except that flashing colours are not supported. (There's no reason why they should be.)

Design Output

ArcImEd can output your design in two forms. Firstly, it can produce a *EXECable file that contains the control codes necessary to produce the correct graphics. This is a technique often used on the Master to load things into Shadow RAM – it can also be used to good effect on the Archimedes, since it's usually faster than *Screenload). Secondly, it can output a BASIC program or procedure. When you select the disk icon, you can specify the name of the program or procedure (or use the default). You can select MakeBasic to convert the design currently in memory into BASIC. You have control over certain options, such as whether you want a program or procedure, whether you want colour statements to be added to the program to define the palette as you've set it in ArcImEd and finally to say if you want the BASIC program to create the diagram using relative commands, so that you can move your drawing around. This is all very flexible.

When you select MakeBasic, the program is actually made up in memory and left there. You can leave ArcImEd by clicking on the exit icon. When you leave, you will find all the programs and/or procedures that have been put there by the MakeBasic command. You can then save or list or run the program as normal. After you have left the program using the exit icon, pressing <F4> starts the system up again, without any disc access.

Commands

The commands icon provides access to the drawing facilities. Facilities are available for drawing lines, dots, rectangles, triangles, circles, ellipses etc.

There are many other features. For example you can zoom in on a drawing, enable the crosshairs (these follow the mouse pointer and are useful for getting things in line) and you can cause the computer to display the current co-ordinates of the mouse pointer at the top right hand side of the screen. A lot of attention has been paid to detail – for example, it is possible to turn the mouse pointer around (so that it points SE instead of NE) in case the normal pointer obstructs your view when drawing.

Problems

I spotted two problems when using the program. When you are selecting the icons from the icon menu, it is possible to cause an 'undefined variable' error if you click on the barrier (i.e. the black line) between one icon or another, or say you click on the title. Secondly, if I tried to load a file that didn't exist, the operations window appeared at the bottom left hand of the screen – it wasn't there for any reason, it just appeared and blotted out part of the drawing area.

Conclusions

I must say that I like this package – the combination of an original idea and superb implementation has lead to a good product. If you write any BASIC programs that could use diagrams or drawings, then this program could save you a great deal of time. The results would probably be more professional, because you can see the screen as you design it – goodbye graph paper!

ArcImEd from Jansons at £24.95 inclusive. A

M/C Answers

Here is the answer to the test of your machine code programming ability set by Alan Glover on page 39.

The program is testing that R0 has a value of 30, 40 or 50. If it has, it proclaims "Good Value", otherwise it proclaims "Bad Value" instead. A

Which Word-Processor?

Rob Brown

At long last there is a growing choice of business software for the Archimedes, particularly in the realm of word-processing. Last month's issue of Archive (number 10) included full reviews of two of the latest First Word Plus and Pipedream and an earlier issue (number 6) included a full review of Graphic-Writer. Various other issues have contained brief comments on other products. The purpose of this article is to compare the significant features of three contrasting word-processing products – ArcWriter and First Word Plus (both from Acorn) and Inter-Word (from Computer Concepts).

Introduction

All three products arrived with instruction manuals (of varying size) and a function key strip. However, whilst both ArcWriter and First Word Plus are disc based (the latter on two 3.5" discs), Inter-Word is ROM based and thus requires the prior fitting of a ROM/RAM podule (and backplane for Archimedes 305/310 owners).

Both ArcWriter and Inter-Word are fairly basic word-processors whereas First Word Plus comes complete with its own spelling checker, a mailmerge suite and can incorporate simple graphics. Although Computer Concepts' Spell-Master spelling checker is designed to operate with Inter-Word it is again only available on ROM, and of course at extra cost!

From (non copy protected) 3.5" disc, both ArcWriter and First Word Plus take a little while for the program to load – some 15 and 20 seconds respectively, whereas Inter-Word is virtually instantaneous – provided that you have loaded the 6502 emulator into podule-based RAM. This highlights another difference between the products in that Inter-Word, being converted from the BBC version and thus running under the emulator, can only hold a single document occupying up to 32k of memory; but its 'Multi-file' facility does provided a way of linking separate smaller files into one overall document. The size of document in ArcWriter and First Word Plus is only limited by total memory available, and First Word Plus goes even further and allows up to four files to be open at once although the totale amount of text is limited by the memory size.

Documentation

As mentioned earlier, the manuals vary in size and ease of use. That for ArcWriter runs to around 70 pages and is just about adequate to get you going, although I found the section on printer control codes to be somewhat lacking with the user being referred to one's own printer documentation which is normally less than helpful!

The Inter-Word manual appears to be identical to the BBC document (at just over 100 pages) with a separate leaflet highlighting the significant differences between the two versions. Since I have already used Inter-Word on my BBC for some time, I obviously found no difficulty but I had also obtained a further book at the time by Rob Pickering entitled Understanding Inter-Word! (I believe this is still available.)

The First Word Plus manual is certainly comprehensive at over 240 pages and contains a very good introduction both to word-processing and to the software itself. There are useful tutorial sections included as well as more technical subjects (e.g. on creating one's own printer driver), but I think the very size of the manual could be daunting to the first time user. With twin drives fitted to my Archimedes I found it useful to copy all essential programs on to the one "program" disc with a separate "data" disc in the other drive. Although this is easy to do, use of First Word Plus with twin drives did not appear to be covered very well in the manual.

Entering Text

Both ArcWriter and First Word Plus make full use of the WIMP environment of the Archimedes, with the more common commands also selectable by function and other keys. Although Inter-Word makes no use of the mouse and the screen display appears more spartan, there are various menu options which are again selectable by function and other keys.

Now available

£105 from Archive

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PipeDream for the Acorn Archimedes costs £99 + VAT.

It is not possible to detail all of PipeDream's facilities here. For full details or to order PipeDream call us on 0954 211472 or write to us at Colton Software, Broadway House, 149-151 St Neots Road, Cambridge CB3 7QJ.

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It is in the realm of entering text that ArcWriter is let down; even two fingered typists (like me) can find themselves typing ahead of the screen display. The display itself of the words is none too clear, and even after the modification to cure the infamous Archimedes "buzz", there is still some screen disturbance. Another occasional problem is that, due to various program bugs, parts of the screen display or menus can become corrupted or don't clear properly. One useful feature is that the various print styles supported, even including enlarged, appear as such on the screen.

Both First Word Plus and Inter-Word offer proper (fast) screen updating with the main print styles (e.g. italic and underlined) appearing as such on the screen. First Word Plus offers the more comprehensive facilities for this, but neither show enlarged text as such on the screen. Most of the usual word processing features are included in both but in addition, First Word Plus has facilities for including footnotes, entering international characters, and has a maximum text width of 160 characters; whereas whilst Inter-Word can print multi-column text, it has a maximum text width of 120 characters. On balance I found the combination of features, use of the mouse and appropriate function keys afforded by First Word Plus to be preferable, in addition it also has a useful facility for extra "Help" messages to appear on screen.

Printing Text

Both ArcWriter and First Word Plus require additional printer-drivers to be used to print out the text. Certain basic ones are provided (a few with ArcWriter, over 20 with First Word Plus – including the Epson JX/EX colour printer) and facilities are provided to design additional ones to suit particular printers. To save time, it is possible with both products to "customise" an existing printer-driver.

Inter-Word operates entirely differently in that there is a Control Codes menu which is used to set the 'Escape' sequences for the four basic print styles supported, these Control Codes are normally saved with the document, but can be saved and loaded separately if required. Whilst this approach is simpler, it does require one to have handy a table of the codes!

When it comes to printing the document, unless you have a large printer buffer, with both ArcWriter and Inter-Word the Archimedes is unusable for anything else. Printing can also highlight further program bugs with ArcWriter if the printer is not connected or switched off! First Word Plus is different in that the document must first be saved, and then selected for printing; the advantage of this approach is that a further document can be created or edited whilst the first document is printing in the background.

Conclusion

ArcWriter was supplied free to all registered Archimedes owners who purchased their machines up to some months ago, and although it has one or two nice features there are far too many drawbacks for it to be regarded as a serious word-processor. I do not think that new purchasers of the Archimedes are missing much!

Inter-Word has been converted from the BBC version with a few changes. Although it was one of the more advanced word-processors for that machine it hardly does the Archimedes justice. However, it does have one or two nice features and in my view has the best interface with its own spelling-checker, SpellMaster. On a value for money basis, the cost of Inter-Word, SpellMaster plus the ROM/RAM podule (and backplane) puts it into a price bracket not really justified by its features, unless you require exact compatibility and ease of transfer with Inter-Word files on a BBC.

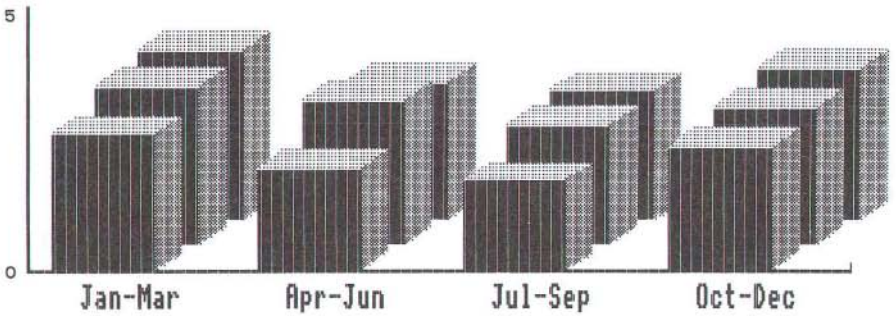
First Word Plus has a comprehensive list of features, is supplied with very good documentation, and appears to offer the user nearly everything he could want from a word-processor. At the half price offer from Acorn (to those who bought their Archimedes before the end of March) it represents excellent value for money. However, the competition is growing and at full price it must be matched against other products, some of which offer an integrated approach (e.g. Pipedream) and others which will run under the PC Emulator. In the end it is the customer who will decide because ease of use is as important, if not more so, than "bells and whistles". A

PRESENTER

Affordable Presentation Graphics for the

Archimedes

PRESENTER is a truly professional graphics program which allows the user to create, modify, print out or photograph high quality colour displays of data in either bar, pie or line format. Data is entered either manually in spreadsheet fashion or can be imported from other spreadsheets or programs in comma separated format. ***PRESENTER*** makes full use of the **Archimedes'** WIMP environment and high resolution graphic modes and incorporates 3D displays, auto-scaling axis, user definable layouts and multi-layer graphs. Screens may be saved for use with graphic packages like ***ARTISAN*** or graphic wordprocessors like ***1ST WORD PLUS*** & ***GRAPHIC WRITER***. ***PRESENTER*** can also be used with ***PIPEDREAM***.



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```
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Genesis of an Irregular Database

Sean O'Connaill

Sean O' Connaill of Texcellence, the author of Arc TFS, has written a piece for us about how this innovative piece of software came into being. We are publishing his contribution because it seems to us to be a new(?) idea that deserves recognition. This is ***not*** *a review – we are hoping to have some notes from a reviewer next month.*

When I first got my BBC Micro in 1983 (for my children) I was instantly hooked. I am a busy teacher with duties which include timetabling for tests, preparing worksheets and exam papers – and trying to stay abreast of my subject – History. The wordprocessor (Wordwise) immediately became my favourite tool – but something was soon lacking – a simple way of filing the essence of all of the interesting data I came across. The database seemed the solution – at first.

However, all my efforts to use the normal flat file database proved discouraging. These tools require the careful setting up of a 'card format' with fixed fields. Usually this format was unalterable – but even when it could be altered, fields still had to be dimensioned at the maximum likely size of the data. This meant either a large file with short and restrictive fields, or a small file with large fields which would not be fully used.

But that was the least of my problems. Historical data is most interesting when it is totally surprising – when you are learning something entirely new. How do you construct a flat file database for data whose character you cannot predict beforehand? In fact, you can't. Essentially you require a 'field' which is entirely open, of greatly variable length, and a means of cross-referencing each item in this field in a simple way. A program which could do this would amount to a computerised notebook. It would be even better if you could then link this program in some way with a wordprocessor, so that all of those painstaking notes would not have to be re-typed when the need arose to prepare a formal synthesis of all you had learned?

It did not take me long to discover that no such tool existed for the BBC Micro. Even this paragon of educational micros had to make do with databases originating in commercial data processing. Essentially they had to do with numbers, not ideas – and this was not a happy state of affairs. Many of my colleagues in the Arts subjects looked upon the computer as a soulless machine, essentially alien to the spiritual side of man – and therefore ultimately useless, if not positively malign. Could they possibly be right, I wondered?

By this time I had written, with great pain (I am entirely non-mathematical and non-computerate), a BASIC program to timetable school tests and another to teach simple historical concepts. I had learned, in short, about BASIC procedures, arrays, file-handling and text-handling. The astonishing speed at which the micro could find a given string in an array, or in a random-access file, bowled me over. This facility simply had to be of some use in even those academic subjects where the raw data comes in many different shapes and sizes. Could I now write the sort of 'irregular textual database' whose design I had already dimly outlined?

Soon enough I found that there were hardware constraints even more insurmountable than my own profound ignorance. The 32k BBC Micro simply could not hold the program even in its earliest, crudest form. The various 'portakabin' solutions provided by Acorn in the absence of a 16 bit machine were unconvincing, to say the least. (They reminded me of some houses I had seen in rural Ireland where the owner had knocked down walls and added rooms as the family grew.) I bought one of the early Atari STs, complete with half-brick power supplies, and set to work.

Computer Concepts' Fast BASIC came as the answer to a prayer – it was procedure-based, closely related to BBC basic, and well documented – particularly in its control of GEM, the ST's WIMP interface.

Gradually the program took shape and began to work. It became a total obsession. I began to experience that extraordinary joy that goes with intensive work into the early hours when suddenly, there on the screen appears exactly what you have wanted to see for weeks, and couldn't quite get. One example springs to mind...

I had worked out a system of referencing each irregular text item with a string of indexing codes. (I call them 'Context' codes because they label the 'contexts' within which each text item is significant.) These codes were 'explained' in a separate, searchable file. You could search this file for a given idea, find the code, and then use it either to file the next Text item or search for previous items.

The context codes and text were linked by a central direct-access file which held, for each text item, a string

of these codes, and in the same 'record' the address of the text item in its own serial file. The whole concept depended upon the ability of the program to find all 'linker' records holding a given code, and then, using the pointer in the 'address' field, find all of the corresponding text items.

My file related to another personal obsession – the origins of the French Revolution (itself the origin of so many others). Could I find all text items filed which related to the financial problems of the Ancien Regime?

As the number of 'matched' items trickled up to 6, the tension built. TFS was finding the Linker occurrences of 'FIN', the code for 'Financial problems and administration' – but could it faithfully find the text items related to this code? They did not occupy fixed-length 'slots' in their file, so were lost forever unless the pointer in the 'Linker' file was their precise initial byte. I clicked on the GEM menu item 'Forward' – and there in the Text window appeared a short paragraph beginning: "Between 1733 and 1783 France fought four wars costing 4000 million livres, about £200 million." I clicked on 'Forward' again, and another 'finance' item faithfully appeared. And so it went – six items – all perfectly correct, all faithfully reproduced, all related to the object of the search, all of different lengths – some so long I had to scroll the text window to read them. And they were held on a 3.5 inch disc capable of holding 1600 such items, averaging 400 characters in length.

It was a moment of extraordinary personal satisfaction, but my strongest emotion was one of wonder. Why do we live in a universe where a highly complex, idealised result, can actually be realised (albeit with much toil) within the circuits of a small machine? The micro, I had proved, could have extraordinary power in my own chosen academic field – and in others with similar data to control – but why? Why is it that in a world which we have made almost uninhabitable and incomprehensible, pure, beneficent logic is also a living reality? I can think of no logical reason for this paradox.

There were many other such moments – when I first managed to fool First Word into accepting one of my own text files as one of its own, for example. But I have never lost that sense of wonder. I hope I never shall.

The ST version of TFS has been on sale, in glorious BASIC, for some months now. I never intended to be a software publisher – the practical illiteracy of those houses to whom I sent my BASIC prototype eventually drove me to it. ('The willingness to read is always inversely proportionate to the quantity to be read'. – O'Conaill's law.) It has made me many friends and given me the incentive to re-write the program in BASIC V for the Archimedes. In its latest incarnation it has a menu-related Help system, automatic transfer of Context and Source codes for searching and filing, and speed to boggle the mind. In a month or two I should be able to rig it for a hard-disc (I still have to save up) and link it to a Z88. The once tortuous route from the learned word in the field or the library to the written synthesis of a lifetime's study will then be an easy thoroughfare. On the Archimedes, TFS is finally completely at ease – a fitting end for a program inspired by its humble predecessor.

Of course, there are those who sneer patronisingly at the fact that TFS is still in BASIC. Such people (Pascal miniaturists mostly) will never understand that the medium is unimportant if the realisation is structured, robust and complete – they are like yachtsmen who would drown rather than climb aboard an inflatable. They remind me also of that precious fraternity, the dry-fly trout anglers who sneer at the humble worm. In this part of the world, most anglers have a proper respect for the worm because, when skilfully used, it catches very some big fish.

On the other hand, Dr R.J.Pinney's recent letter exemplifies much of the recent reaction to TFS (since Richard Seel's kind review of ST TFS in ST World): "I only wish I had access to such a facility when I was doing my PhD, many years ago." Dr Pinney is a scientist who has shown that TFS can export a precise bibliography of complete, complex citations to First Word (and thus to First Word Plus) whenever it is required. It amazes me that despite the enormous University investment in computing (and Pascal), it should be left to a grammar school history teacher with no formal computer training to design and create a tool uniquely desirable to and affordable by third level academics in all fields. Perhaps it is that combination which is the secret.

Because of the current size and penury of my obvious market, I'm unlikely to make a fortune from TFS. My greatest ambition is to see it (or even superior 'clones') in common use among those who think and teach. To some who have written to me, I have sold it on a return-if-unsuitable basis, simply because I like to hear how people propose to use it in their own field, and because (like the editor of this journal) I like to trust people. So, if you're interested, write and tell me why (students particularly welcome). A

Signwriter for the Archimedes

Adrian Look

Signwriter is now available for the Archimedes (£49.95 inclusive) from Wight Scientific. It is a program which is available for the BBC, IBM, and several other computers. If you have been to any of the BBC computer shows, you will no doubt have seen the Signwriter output. However, for those who haven't, Signwriter it is exactly that! A suite of programs which allows you to print-out quality signs on a wide range of printers; and as their motto goes, 'the bigger the better'! It is able to do this because the program represents the characters geometrically (as lines and curves) rather than as a series of dots. So whatever the size of the character, the programs can calculate the best bit-image to print out. On top of that, Wight Scientific have a list of extra fonts (that can be bought at £5 + VAT each). These are varied and very impressive – designed by a real live artist!

Signwriter comes in an attractive plastic wallet similar to the packaging of ArcWriter and the PC Emulator. It contains the IBM version instructions and supplementary notes for the Archimedes. Between the two, the instructions are comprehensive, if not a little verbose. Also contained are three copies of the keystrip and, of course, the program disc. Unfortunately there is only one font 'Sign font' on the disc – this my only real grumble. I would have liked to have seen at least one other font and, at £49.95, I think Archimedes owners deserve better value for their money.

There are four programs provided: SignIn is used to create your signs; SignOut prints the created signs on your printer; Design allows you to edit and create existing, or new characters/fonts; and FontCalc takes the workings of Design and puts it into SignOut format.

When you boot up the disc, the SignIn program will be run. From the main menu of SignIn, you can either run the SignOut program, edit a sign, or select the sign's default settings. These consist of: the input source (keyboard, sign data file, text file), orientation, width, justification, borders, and the output filename. As with all of the programs, the default settings are very sensibly chosen and they save a lot of work.

The sign is edited as a series of lines of text. Each line has certain attributes, such as height (width is automatically calculated from this), inter-character spacing (fixed, or proportional), inter-line spacing, justification, font number and other more esoteric attributes. There is a good help screen provided which is accessed by pressing <f1>. All the facilities available in SignIn are shown here. Having created your sign you press <f8> to leave the edit page.

The next page gives you several options: store the sign and return to BASIC, repeat the sign, send codes to the printer, add 'blocks', plus several others, and by default save the sign and go to SignOut (the storing of the sign implements a reassuring archiving facility i.e. if the output file already existed then the old file will be re-named and you will be notified that this has been done).

Having created your sign and saved it you can now print it out using SignOut. Like SignIn, SignOut has several options (of which the default is just to print the plain sign): mirror image the sign, quick print (low resolution), send the output to a file on disk, scale the sign, and repeated prints. Once your options have been selected, SignOut will do much calculation in order to print out the sign. Wight Scientific say that the Archimedes version is the fastest, even still it does take a while before the sign is completed.

The Design program shows the biggest concession to the Archimedes' capabilities, and is mainly mouse driven (however, like the rest of the package it is only in black an white). Design allows you to create/edit your own characters using curves, lines and a whole host of other facilities. The characters can very easily and effectively be manipulated. Design offers such facilities as: rotate, italicise, mirror, scaling, merging (with another character), and a back to back facility (put the character next to itself and reduce its size) – this allows you to create ligatures.

Finally, FontCalc allows you to put several fonts together (as designed by Design) and convert them for use by SignIn and SignOut.

Despite its flexibility and the miriad of options, the package is very easy to use and within minutes of getting the package you can get good results from it (this is due to the good choice of defaults). It does take longer to come to grips with the more complex operations of Signwriter but the results speak for themselves. In conclusion, although Signwriter is converted from the IBM, it does 'hang well' on the Archimedes. It is a quality package which has benefited from continual development (by taking heed of the constructive criticisms/suggestions of the customers). A

SoundSynth Revisited

Ian Nicholls

In the July edition, at the end of the third article in my series on sound synthesis, I made a few comments on the SoundSynth package produced by EMR Ltd. I made some unfavourable comments on the manual and noted the unexpected results you obtained in trying to use the sampled voices on the SoundSynth disc and its companion Creations, with the Welcome disc Music Editor or with BASIC.

Over the last few weeks, I have been in touch with Mike Beecher, the well-known extrovert head of EMR. I have discussed with Mike the points that I raised and some further comments are appropriate, firstly, about the manual. EMR had been expecting a third party to produce a high-quality manual for them but they were let down at the last minute. Hence, the present manual is very much an interim version and a better one, which explains the commands in more detail, with examples, will be produced when and if time permits. EMR are working extremely hard to produce further products in the "Arpeggio" series for the Archimedes as quickly as possible: indeed, they are working to almost impossible deadlines.

No one else seems to be attempting to develop software which exploits the tremendous potential of the Archimedes sound system, so EMR are to be encouraged as much as possible, particularly given the very high quality of the first product in the Arpeggio series.

The second comment that I made about SoundSynth was the fact that the different sampled sounds were sampled at varying pitches, none of which sounded at the same pitch as the ROM voices in the Archimedes. This made their use in BASIC and the Acorn Music Editor most unsatisfactory.

EMR's prime argument is that the SoundSynth package is but the first part of a fully-integrated suite of programs. Within this suite, the problems that I have raised are irrelevant: any voice will be capable of being re-tuned to any pitch independently of any other and a much more comprehensive music editor, sequencer, etc. will provide all the music-making facilities you could possibly want.

Whilst this is true in the longer term, only SoundSynth is available at present and purchasers of the package will want to use its sampled sounds and user-created sounds in BASIC programs or with the Acorn Music Editor. Mike Beecher has acknowledged these points and has produced revised versions of both SoundSynth and Creations (version 1.3 in both cases). The sampled voices on the SoundSynth disc for which a pitch is appropriate are now all at the same pitch – E; although naturally not the same octave in every case.

When they are loaded using the waveform filing system and installed, all of them sound at a different pitch – C, middle C in the case of the Piano voice. This is an aspect of differences between EMR's and Acorn's use of the sound generation hardware on the Archimedes.

In the case of the Creations disc, those sampled voices for which a pitch is meaningful are now all sampled at the pitch of C; again, not all the voices are sampled in the same octave, though. To make these voices sound at a C pitch in BASIC, or with the Acorn Music Editor, it is necessary to alter the tuning downwards as explained in my July comments; the command is *TUNING -&1AAA . If the tuning is not altered in this way, middle C with these voices will sound as A#6 (i.e. A sharp in the next octave above middle C).

These changes are a real improvement in making SoundSynth useable, until further products in the Arpeggio series are released, and are about as far as one could reasonably expect EMR to go in modifying their products.

One or two other minor changes have been made to the software between versions 1.2 and 1.3. The most noticeable is in the menu program which presents you with a screen full of icons, each one representing one of the packages in the Arpeggio suite.

In version 1.2, only the SoundSynth icon was filled in, all the rest were blank. With version 1.3 the other icons have all been filled in and they are extremely well done, including one which says "more", although there are no more at present! Assuming that these icons truly represent further products in

Flying Start II – Archimedes Database

Tony Colombat

Flying Start II is a PC card index database, rewritten to work in the ARM environment by Mitre Software. The philosophy behind the package is to provide a powerful but easy to use menu driven system. All the user's requirements are provided through the database menus including formatting discs and backing up files. The program has not been modified to take advantage of the Archimedes WIMP environment but help screens are provided through <F1>.

An adequate Tutorial is included, albeit with poor illustrations and strangely no reference to the example databases supplied. A separate Manual appears to be the unchanged MS-DOS version and whilst clear and concise, provides only a little extra detail. Other booklets are helpful in listing the Manual's shortcomings and detailing a few extra features in the Archimedes version.

Flying Start is very easy to master, using menus and a limited number of keys. Users can create their own files, or modify the templates supplied on the "Pilot System" disc. There are limited "Relational" facilities between datafiles and five of the twenty four fields can be "Indexed" for quickly finding records. Particularly useful features include data protection through passwords and the ease with which established systems can be modified.

Reports and label options allow for the output of data and, once developed, they are saved on disc for future use or modification. In a report, the user is allowed to exclude records through a number of search criteria, though only one per field. This seems an unusual way of performing searches and of concern is the omission of part-string search of fields. The power of the system, is shown in the time taken to search 500 records stored on disc – just one minute.

Flying Start is provided with two extra utilities, accessed outside of the main program. The first transfers the package to a hard disc. The second provides a means of Importing data from ASCII, BBC and Viewstore files. A booklet providing the limited instructions, mentions that ASCII and BBC files, must be of certain types but does not explain how to change them using;

*SETTYPE <filename> <type> (p.214 in PRM)

Even worse is the non-existent help for Viewstore imports which must be "data" files with file type &FFD. Finally there is no mention that data to be imported must be on 800k discs, not 640k! Once these problems were solved, the import utility worked well except that Flying Start would not accept Viewstore dates.

Some Archimedes users may find the limited screen handling not to their taste and the £99.95 price tag unjustified for the facilities offered. Flying Start II does however, provide a powerful, easy to use and modify database system, which permits quick access to data through reports and labels. For those with limited computer experience, there are the templates and being able to perform all disc operations from the program, thus allowing Mitre to achieve its objective of giving the beginner a "Flying Start." A

the series, they can only be described as mouth-watering; here is the list:– Arc Sequencer, Performer, Composer, Music Editor, Notator, VuMusic, Studio 24 Plus, Mixing Desk, Drummer, Midibank, Score Writer, Voice Creator, Pro-Sampler, Midi Analyser, Music Teacher, Handi-Music. The next product to be released should be Studio 24 Plus and it is hoped to preview it at the Personal Computer show mentioned above. If you get the chance, go to the EMR stand, I do not think you will be disappointed! A

Contact Box

• **Archimedian Pen-Pals.** Frode Myklebust would like Archimedian pen-pals in Holland, Sweden, Norway, Germany, Switzerland, Australia and Canada! Frode Myklebust, Brenslene 6, 6100 Volda, Norway.

• **BASIC V detectives.** Is anyone digging inside BASIC V? Dr W Riha, 138 Argie Avenue, Leeds, LS4 2TG, would like to know anything about it that anyone can tell him.

• **German User Group.** GERACUS, the German Acorn Users' group has a number of folk interested in Archimedes and would like to contact more. Write to Roul Sebastion John, Wasserstrasse 475, D–4630 Bochum 1, West Germany. A

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